

AUTOMOTIVE INDUSTRIES

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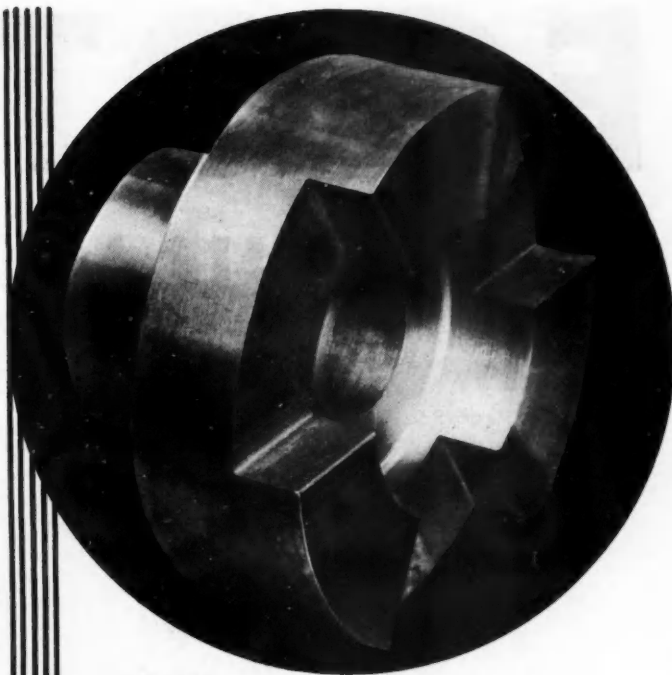
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Automotive Industries



Vascoloy-Ramet

(HARD CUTTING ALLOY)

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But Look What Vascoloy-Ramet Did!

MATERIAL:—

Chrome-Nickel-Molybdenum Steel heat treated to about 330 Brinell.

TOOLS:—

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1—3/4" square standard left hand Vascoloy Tipped Tool.
1—1/2" square standard left hand Vascoloy Tipped Boring Tool.

MACHINE:—

24" Boring Mill, belt drive.

PERFORMANCE:—

Speed—140 ft. P. M.
Feed—.018 inch.
Cut—Varying from 1/8" to 3/8" on the face and outside diameter.
Finish size of clutch—12" O.D. with 7 1/2" length of bore.

RESULTS:—

On boring operation, interrupted cut varying from .000 to 1/8" two roughing cuts and one semi-finished cut 7 1/2" long, no tools being reground.

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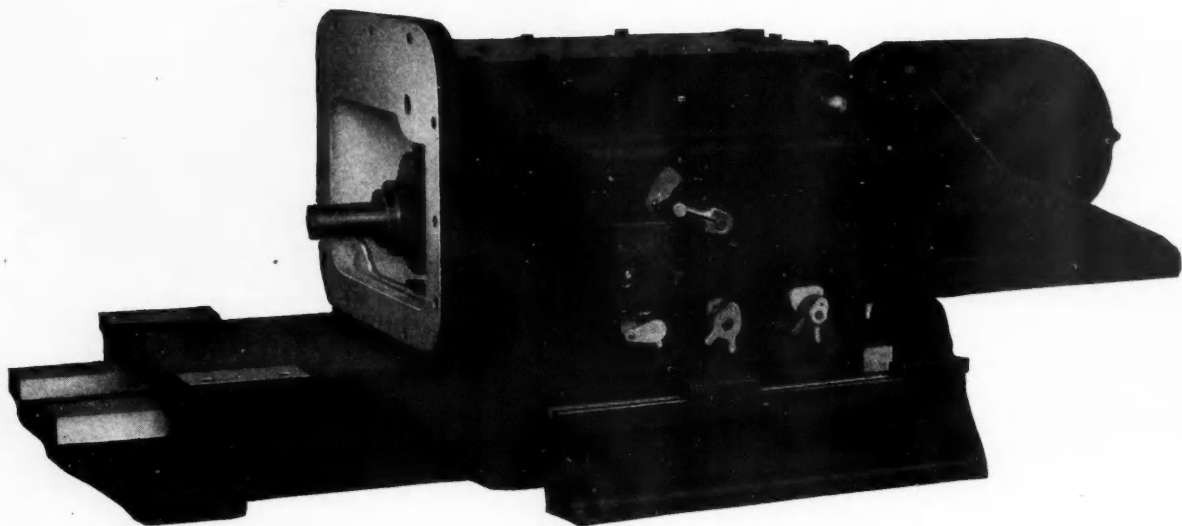
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June 15, 1935

FOOTBURT

HYDRAULIC FEED UNITS



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Both feed rate and length of rapid traverse and slow feeds are variable. Simultaneous feed throw-in of all units is by means of Solenoids with push button located at most convenient position.

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THE FOOTE-BURT COMPANY, Cleveland, Ohio

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Schedules for June Equal May

Second Quarter's Output Expected to Eclipse First

by Harold E. Gronseth

Detroit News Editor, Automotive Industries

A second quarter output by the motor industry greater than that of the first quarter is virtually assured by schedules laid out for the final month of the period. Despite a slowing down by a majority of the producers, the industry's June program calls for the building of fully as many vehicles as in May when the estimated output was 377,754 cars and trucks. The final week of May lost two production days by the closing of most plants for Memorial Day and the day following, with the result that the May output failed to attain earlier estimates.

Eighteen manufacturers who accounted for 94 per cent of last month's production have schedules for June calling for 3000 more vehicles than they turned out in May. The bulk of the shrinkage in the schedules of most plants has been taken up by Chevrolet's heavy increase necessitated by its car shortage caused last month by the strike.

Chevrolet's June program restores the company to first place in volume for the current month and boosts General Motors output 38 per cent beyond that of May.

By June 1 the industry lacked only 234,000 units of equalling its first quarter's output of 1,113,835 cars and trucks. The projected June figure will bring the second quarter to approximately 150,000 units in excess of the first three months. The total for five months is 1,988,637 units, which compares with 1,175,965 in the corresponding period of 1934.

(Turn to page 786, please)

Campbell Foundry Develops New Alloy Steel Piston

An alloy steel piston considerably lighter than those now being made from iron, and said to weigh no more than pistons made of aluminum, has been developed by Campbell, Wyant and Cannon Foundry Co. Evidently this report has some relation to rumors that one of the large producers is installing a piston of this type experimentally in a small proportion of each day's production in order to get field experience. Increased business is being obtained by the company from the motor industry on two other products—centrifugally cast brake drums and alloy steel camshafts.

Automotive Industries

AMA Annual Meeting at Detroit Wednesday

The annual meeting of the members of the Automobile Manufacturers' Association will be held in Detroit in the afternoon of June 19. It will be preceded by a morning meeting of the directors. AMA export managers will meet in Detroit on June 18.

Accessories Sales Up 126%

Canadian accessories sales for the first four months of this year increased 126.6 per cent over the corresponding period of 1934, according to J. H. Hickey, director of parts and service for the Chrysler Corp. of Canada, Ltd., Windsor, Ont.



Dr. Henry Ford

Who was given the honorary degree of Doctor of Laws by Colgate University this week.

Greater Safety Plans for Speedway Being Considered

Several plans for modifying the Indianapolis Speedway in the interests of greater safety are under consideration. It is expected that the turns will be widened and more steeply banked. Changes may be made in the outer wall and the inner apron may be increased in width. Sections of the track also are scheduled for resurfacing.

Continuance of Skeletonized NRA Appears Sure as Senate Gives OK

WASHINGTON, June 13—Smashing through a 15 hour filibuster by Senator Long the Senate at 6.15 this morning passed the NRA extension resolution by a vote of 41 to 13. The measure now goes back to the House and it is expected will be called up tomorrow (Friday) and passed without difficulty.

Thus the "fact finding," skeletonized NRA has its life extended until April 1, 1936. However, it is doubted that the emasculated NRA will carry much appeal for industry. The Senate-passed resolution permits voluntary trade agreements if they contain labor guarantees and do not violate the anti-trust laws. The provision against violation of the anti-trust laws was carried in an amend-

ment offered by Senator Borah. Administration leaders strongly opposed the Borah amendment and on the House side it was declared the Senate measure would not be accepted. However, after a White House conference, House leaders announced the bill will be taken up tomorrow and the Senate amendments accepted because the President has suggested such action.

Chairman O'Connor of the House Committee on Rules said that he considered the Senate measure innocuous but that "after all it will have to be accepted" because of the short time left for further consideration of the legislation inasmuch as NRA would otherwise expire on Sunday.

June 15, 1935

May Sales of GM Cars to Consumers Exceeded Those to Dealers in U. S.

May sales of General Motors cars to world dealers, dealers in the United States and consumers in this country were the highest for any corresponding May since 1931. While dealer inventories have been steadily mounting since the first of the current year, May totals showed a decrease of 3,892 in U. S. dealer stocks due to increased sales to consumers in this country. Sales for the January-May period of 1935 were the highest since 1929. Comparative figures for 1935 and 1934 are shown in the accompanying table:

	May, 1935	April, 1935	May, 1934	Five Mos., 1935	Five Mos., 1934
Sales to world dealers.....	134,597	184,059	132,837	707,372	603,395
Sales to U. S. dealers.....	105,159	152,946	103,844	559,361	474,078
Sales to U. S. consumers.....	109,051	143,909	95,253	511,053	382,125
Change in U. S. dealer stocks.....	-3,892	+10,931	+8,591	+48,308	+91,853
Sales to foreign dealers.....	29,438	31,113	28,993	148,011	132,317

AMA Leaders to Weigh Eastman Bill Support

The directors and the policy, executive and legislative committees of the American Trucking Association are expected to meet Monday in Washington to finally decide whether they will support or oppose the Eastman Bill regulating motor trucks and buses.

The meeting was called in the light of the legislative situation. The association had given conditioned support to the Eastman bill, but since then the President has deferred until the next session action on a companion measure to reorganize the Interstate Commerce Commission under which a separate division would be established to administer the motor vehicle act. The meeting will determine whether or not postponement of action on the reorganization will affect the position of the association toward the Eastman regulatory measure.

The belief prevails that the association will support the latter measure. It has been pointed out that the regulations cannot be prepared in any event before January 1 although the measure provides that it can be made effective either on that date or July 1. It is not believed that regulations and organization under the act could be completed by July 1 and that therefore postponement of the reorganization measure will have no important bearing on the situation.

At the offices of the National Association of Motor Bus Operators it was stated that the association will continue to support the Eastman bill regardless of the time of action on the reorganization measure.

Chrysler Retires Part of \$25,000,000 Loan July 6

On July 6, approximately five years before maturity, the Chrysler Corp. will pay \$5,000,000 of the \$25,000,000 loan, arranged in five equal maturities and obtained from banks several months ago to retire \$30,150,500 of Dodge Bros. six per cent debentures.

The \$5,000,000 of the notes to be paid

off next month are actually due May 1, 1940, and bear the highest interest rate of the five maturities. Anticipation of this obligation by the corporation, it is pointed out, will save the Chrysler organization about \$150,000 annually in interest for the next five years. The date of the next regular maturity on the \$25,000,000 loan is May 1, 1936.

Pontiac's Pacific Field Men to Meet in Oakland

Members of the Pacific Region field personnel of Pontiac will meet with home office executives Thursday and Friday, June 13 and 14, at Oakland, Calif., to study every function of the sales division and company

policies. More than 60 staff men are expected to attend. This meeting is similar to those previously conducted in New York, Cincinnati and Chicago.

A. W. L. Gilpin, vice-president and general sales manager, will conduct the coming meetings as he has those in the past. The program will comprise lectures and theatrical presentations of the subjects under discussion. Oral and written examinations will comprise a part of each meeting. Other sales executives who will participate in the meetings are J. S. Evenson, sales promotion manager; O. A. Lamareux, parts and accessories manager; P. J. Dean, head of business managements; J. L. Johnson, organization and analysis manager; G. D. Sills, sales promotion department, and H. C. Weaver, head of the Customer Research Division of General Motors.

Willys Leaves Louisville Hospital for N. Y. Home

John N. Willys, Toledo automobile manufacturer, has recovered sufficiently from a heart attack to leave the John N. Norton Memorial Infirmary, Louisville, where he had been under treatment since May 5. Mr. Willys returned to New York in his private car with Dr. Morris M. Weiss and Dr. Clarence Bandler.

L-O-F Will Rebuild Ill. Plant at \$1,700,000 Cost

Libbey-Owens-Ford Glass Co. will rebuild its Ottawa, Ill., plant. It will be equipped to manufacture laminated safety glass and for storage of finished glass. Work will start at once and involve an expenditure of \$1,700,000. This old Illinois division plant will be self-contained and capable of producing safety glass independent of any other company unit. The plant will be ready for operation early in 1936.

ALB Passing Held Certain; Bargaining Seen as Permanent Fixture in Industry

DETROIT, June 12—There is every evidence that the Automobile Labor Board is dead, although specific confirmation of this fact has not yet come from Washington. The rumor that President Roosevelt simply neglected to mention the ALB in the list of discontinued labor boards recently issued is scouted by some good authorities, but it seems certain that ALB affairs will be wound up within a few weeks.

Just what will become of the bargaining agencies created by the ALB elections remains a bit more obscure. Legally, of course, they lose their standing with the disbanding of the enforcement agency through which they were created. In some plants, however, their effectiveness in dealing with the management has been such as to point to a possibility of their continuance with the strong backing of their constituents. The argument that they lack financial strength to support their efforts by strikes if necessary is belittled by important observers who point out that the unions are

not paying strike benefits in many cases. Where the work of the ALB representatives has been eminently satisfactory to the employees, these observers think, there is a good chance that they will carry on and perhaps grow stronger.

That this may happen in individual instances is supported by the fact that some automotive employers have concluded that they will be better off in the long run dealing with their employees as a group than as individuals. In some cases, it is believed, the management itself will look with favor on continuance of ALB representatives as a contact point in dealings with employees, especially where such a program is satisfactory to the workers. Obviously, this situation will not be universal throughout the industry, but some very important observers outside of labor ranks believe that collective bargaining in some form has come to stay in the automobile industry regardless of national legislation.

Ford to Build Two Australian Plants

New Sydney Factory and Geelong Addition To Cost \$1,000,000 With Equipment

Construction of two new factory buildings in Australia costing approximately \$650,000 and which, with necessary new equipment, will represent an expenditure of more than \$1,000,000, has been announced by Wallace R. Campbell, president of the Ford Motor Co. of Canada, Ltd., East Windsor, Ont. The new buildings will be located at Sydney and Geelong, near Melbourne, and are for the Ford Motor Company of Australia, a subsidiary of the Canadian company.

The larger of the two buildings will be located on a site about 10 miles from the center of Sydney and will have 91,160 sq. ft. of floor space. It will be of conventional Ford factory design and constructed of steel, concrete and brick. The Sydney plant will be used for the assembly of knocked-down chassis shipped from the Ford plant at East Windsor, and also will include office space and a craneway.

The Geelong building will be an addition to the present assembly and body building plant located at this place and which since 1926 has been the center of the Ford organization's Australian activities. The new building will provide additional space for assembly and manufacturing made necessary by the increase in Ford's Australian business during the past two years.

Biel Building Plant for New GM Swiss Subsidiary

The establishment of a new overseas assembly plant at Biel, Switzerland, has been decided on by General Motors Export Corporation. Biel is centrally located from a transportation standpoint, being 45 miles from Basle, 20 from Berne, and is half-way between Geneva and Zurich, the best markets. The labor situation is also favorable, there being a plentiful supply of highly skilled mechanics available.

Under arrangements made with the city, the latter will build a new plant according to General Motors' specifications, which will be leased for a period of years, after which General Motors will have the option of renewing the lease or purchasing the property. The buildings will occupy an area of 125,400 square feet in an area of about 480,000 square feet, and will be near the station and the main railway line. Construction has started and it is expected the plant will begin production by the end of September.

The name finally chosen for the new subsidiary is General Motors Suisse, S. A. (General Motors Schweiz, A. G., in German). The managing director will be Paul R. Buerger, who has been with the General Motors Export Corporation in various capacities since 1921. Other officers will be: Jean Mussard, assistant to the managing director; W. C. Hulbert, treasurer; K. H. G. Meyer, sales manager; J. A. Trefzer, production manager; L. R. McHaile, plant

engineer; and Aubrey Pershouse, service manager.

Through tariff reductions due to assemblage in Switzerland, General Motors expects to increase the sale of its products by at least 33 per cent in that market.

New Timken Specifications List Krupp and Ni-Cr-V

The Timken Steel & Tube Company of Canton, Ohio, has just issued a revised copy of its sheet listing "Timken Steel Specifications." In addition to the range of alloy and carbon steel listed under S.A.E. classifications, this specification sheet also gives the specifications for Krupp, Ni-Cr-V and the special corrosion and heat-resisting steels produced by the Timken Steel & Tube Company.

Commerce Pattern Co. to Supply New Mallory Alloy

E. J. Rousseau, president of the Commerce Pattern Foundry & Machine Co., Detroit, has announced that his company has been licensed by P. R. Mallory Co., to supply the newly developed Mallory 3, heat treatable copper alloy. This company will handle Mallory 3 both as cast and in rolled form. The cast material will be supplied for welding machine attachments and other types of castings where high heat conductivity is desired.

The rolled material will be used for the production of welding tips in the variety required in automotive welding practice. Because of its high conductivity and great hardness, this material is said to produce welding tips having two to three times the useful life of the ordinary cadmium-copper electrode materials.

Creditors' Committee Reports on Willys-Overland Operations

Willys-Overland creditors have been informed by their committee that it is impossible at this time to indicate when a dividend will be paid and what the approximate amount will be.

The Dec. 31, 1934, balance sheet shows cash of \$616,595, receivables of \$32,963 and inventories of \$716,697, making the total of current assets \$1,366,255. Other assets include investments, due from affiliates and other companies, and miscellaneous receivables totaling \$9,656,276, a depreciated plant and property account of \$18,388,903, and deferred charges of \$9,049.

On the liability side, the balance sheet carries liabilities incurred by the receivers amounting to \$469,193, other liabilities including payables, a \$2,000,000 first mortgage, etc., totaling \$8,154,904, a contingency reserve of \$266,080, capital stock at \$27,621,120, and a balance sheet deficit of \$7,090,813. In addition there are miscellaneous claims of about \$2,000,000 for which the receivers deny liability.

The controversy between the general unsecured creditors and the bondholders is still before a Special Master. The bondholders claim that the mortgage is a lien

on all the fixed assets of the company and its claims against wholly owned subsidiaries which include Willys Morrow and Wilson Foundry. The creditors maintain that the lien does not extend to machinery, equipment, etc., acquired after Sept. 1, 1923, the date of the mortgage.

Sales of surplus machinery not needed for production to date have amounted to more than \$1,000,000. Substantially all Willys Morrow equipment has been disposed of. The proceeds of these sales have been impounded, and from these funds a payment of \$250,000 has been made to the trustee for the bondholders.

The receivers have admitted about \$5,200,000 of unsecured claims. Disputed claims amounting to \$2,000,000 are before a Special Master.

Production of the 15,000 vehicles authorized by the court will be completed this month and the receivers hope to receive permission to produce additional cars. The creditors' committee regards these operations as having been beneficial.

Reorganization plans apparently are still in a nebulous state.

K. T. Keller, right, Dodge president, congratulates R. H. Hidey, center, Dodge truck factory manager, upon the opening of the new addition to the truck plant. J. D. Burke, director of truck sales is at the left.



Aluminum Alloys Save Two Tons in Weight of New Yellow Parlor Coach

The new Greyhound parlor coach was presented to a group of Greyhound executives at a luncheon meeting in Detroit this week, by Paul W. Seiler, president, General Motors Truck Corp. This coach represents a distinct departure from previous design both in engineering detail and styling.

It holds 36 passengers in 36 individual chairs, as compared with 33 passengers on present equipment. All seats are elevated above the wheel line and all seats face forward. Seat frames are of aluminum, equipped with rubber cushions and finished in mohair.

Engine, clutch, and transmission are mounted as a unit crosswise at the rear of the vehicle with the radiator at the rear right corner. A combination bevel gear and bevel set is mounted integrally with the transmission and connected to the rear axle by a propeller shaft. The power plant is supported on four rubber insulated brackets, two at the clutch housing and two at the engine front. The power plant as a unit can be readily removed by disconnecting air and gas lines and loosening the engine supports. Minor adjustments can be conveniently made through the rear doors.

Weight distribution is now 1/3-2/3 with dual tires at the rear.

Total weight of the vehicle has been reduced by more than two tons through the use of aluminum alloys in the body structure. The body understructure consists of two 11 in. square heat-treated aluminum box section girders extending the full length of the vehicle.

By mounting the passengers above the wheel level it has been possible to eliminate the roof racks, baggage now being carried in two large compartments under the coach amidships. Compartments can be opened from either side of the coach.

Illumination is novel. The lighting system consists of continuous tube of frosted glass along both sides over the windows and down the center of the ceiling.

A special ventilating system employing four air ducts has been developed for this coach. Two ducts supply fresh air which is taken from the top of the windshield and carried in through a slotted molding over the side windows. Two center ducts take out the exhaust air through a slotted molding in the center of the ceiling. Both in-

take and exhaust air is controlled overhead in front.

Four-wheel air brakes are standard equipment.

This bus was designed cooperatively by Yellow Coach and Greyhound engineers and will start an experimental run immediately in service between Detroit and Chicago.

High Wages, Short Hours Policy Retention Sought

In an effort to preserve the current high wage and short hour policy in Detroit industry, the Michigan Manufacturers' Association has called a meeting of its 1500 members for June 18 at Hotel Statler.

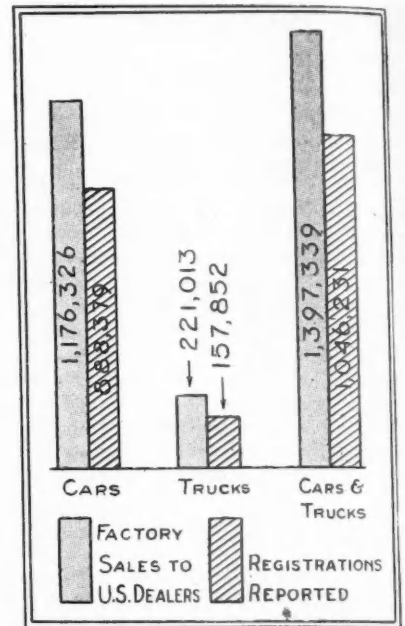
"Michigan intends to accept the challenge issued by the President: 'Can industry govern itself?'" said John L. Lovett, general manager of the association. It is planned to set up committees to handle each phase of the problem. There will be committees on wages, hours and industrial cooperation between employees and employers. Leading motor companies will have representatives at the meeting. One of its purposes is to combat the sentiment that price cutting is likely to follow the killing of the NRA which is having the effect of delaying buying.

Walter Weisenberger, executive vice-president of the National Manufacturers' Association, and James M. Emery, general counsel, both of New York, will be speakers.

Factory Sales Exceed Registrations by 351,108

Factory sales of cars and trucks to dealers in the United States in the first four months of this year were 351,108 in excess of the total of new car and truck registrations reported by R. L. Polk & Co. in the same period. For passenger cars, the excess of factory sales over registrations in the first four months was 287,947, while for trucks the excess was 63,161.

These figures, however, are not believed accurately to measure to actual increase in dealer stocks up to May 1, inasmuch as in the early part of the year particularly there is a lag between actual deliveries and regis-



Sales to dealers and to consumers in the first four months of 1935

tration reports. While there are no figures available for truck stocks, unofficial estimates of car stocks place the actual increase in the period under consideration at roughly 100,000 less than the gain indicated by subtracting registration totals from factory sales. This would indicate that the early-year lag between registrations and sales is of substantial proportions. Later in the year, of course, it will be made up as in recent years there has been little difference between the annual registration total and the total of retail sales as determined from dealer reports to factories.

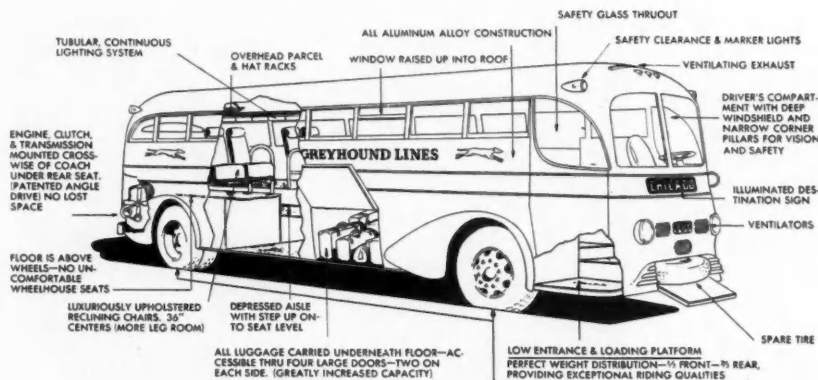
Used Cars Basis of Co-op Ad Campaign by Chevrolet

A nation-wide cooperative advertising campaign on used cars has been arranged for Chevrolet dealers by the Chevrolet Motor Co. Newspapers and magazines are being utilized. The advertising carries the pledge that all Chevrolet dealers stand back of the used cars they sell.

The advertising copy is featuring the "red tag guarantee" instituted 10 years ago by the company and that the tag will be reproduced in full color and size in Sunday newspapers and magazines.

Winterfront Co. Elects B. F. Stein President

B. F. Stein has been elected president of the Pines Winterfront Company, Chicago. Mr. Stein, a director of the company, is a partner in Stein, Brennan & Company, and was formerly associated with the Bendix Aviation Corporation as vice-president, and also with the Stromberger Carburetor Company. The Winterfront Company will be reorganized, entailing the dropping of some products, but retaining the winterfront, its principal product.



New Parlor Coach by Yellow

AAWA Takes in Mass. Union of Service Workers

As a step toward its goal of 100,000 members by September 1, the Associated Automobile Workers of America this week issued a charter to the Automotive and Garage Workers of America, a Massachusetts union which is said to have 5000 mechanics and service station attendants.

This is the first important step by the AAWA to extend its membership beyond the field of automobile production workers. Closest rival of the AFL in the motor industry, the AAWA claims a membership of 31,000 workers, including the new affiliate, with charters issued to 13 locals. The association seceded from the AFL a year ago. Forrest G. Brown, president, said: "We have definitely closed the door to any return to the predatory domination of the AFL. As an industrial union we are here to stay because we offer the only outlet to the laborer dissatisfied with trade unionism."

The association's executive committee is laying plans for a statewide open forum of labor to be held in July, probably in Detroit. The meeting, which will be open to leaders and members of other labor groups, is expected to open the way for bringing into the fold of the AAWA the bargaining agencies set up under the Automobile Labor Board. The association's articles of incorporation allows wide scope to organize workers in the automobile and allied industries.

Reciprocal Trade Policy Gets Approval in South

George F. Bauer, export manager of the Automobile Manufacturers' Association, returned this week from an extensive trip through twelve Southern States and Mexico. During the first three weeks of his trip Mr. Bauer addressed a score of meetings organized in as many Southern cities by local Chambers of Commerce, explaining in simple terms the fundamentals of foreign trade, and showing each group by concrete examples why an increased foreign trade is necessary for a return to prosperity. He reports a surprising interest in foreign trade question, even in such inland cities as Tulsa, Okla., and Dallas, Texas, and he found a wide approval of Secretary of State Hull's reciprocal treaty program.

Mr. Bauer believes that Mexico is quite

Ford to Stage Working Exhibit at Atlantic City

Ford Motor Company will have an exhibit this summer at the Steel Pier in Atlantic City. About 18,000 sq. ft. of space has been taken and preparations already are under way for setting up the exhibit which is to include Ford cars and trucks, Lincoln cars, an engine assembly display with workmen engaged in assembling and disassembling motors, various testing machines and possibly the "Human Ford" which was shown at the World's Fair in Chicago. It is planned to open the exhibit before the end of the month.

Bert Jozwick, veteran woodworker at the De Soto body plant, builds wooden patterns for the steel dies used on steel body parts. He also works at home in an attic workshop. He is shown putting the finishing touches on a 27-inch model he created.



stable politically, and well on the way to recovery. Rising silver prices have inconvenienced the country recently, but with the introduction of the new currency, monetary difficulties will soon disappear. Some of the leading distributors of American cars report sales this year more than double those of last year.

Mr. Bauer's return trip was made by automobile from Mexico City to Monterrey over the new Interamerican Highway. The road for three-fourths of this distance is completely finished and open to traffic. Work is still under way on the remaining stretch of road which may be used only by special permission at present.

House Labor Committee Reports Wagner Bill

The House Labor Committee this week reported the Wagner-Connery Labor Disputes Bill with a warning that failure to pass the measure would create "a menace to industrial peace that cannot be exaggerated." The principal difference between the House and Senate versions of the measure center about the disposition of jurisdictional authority. The Senate bill creates a separate and independent labor relations board while the House bill places jurisdiction in the Labor Department, in line with the plan advocated by Secretary Perkins.

Mandatory Safety Glass Law Signed by LaFollette

Governor LaFollette has signed the bill passed by the Wisconsin Legislature making safety glass mandatory in all motor vehicles manufactured or assembled and operated in that state after January 1 of next year. The Secretary of State, who also is the licensing administrator, is required, under the Act, to maintain a list of approved types of glass as described in the measure and titles of ownership and applications for licenses on new vehicles next year must certify that the glass installed in the vehicle is of an approved type.

Schluter, Thermoid Head; Other Personnel Changes

At a recent meeting directors of the Thermoid Rubber Co., Trenton, N. J., elected Fred Schluter president. In a letter to the company's field force and division managers Mr. Schluter announced several personnel changes.

Arthur Dougal becomes director of replacement sales; Charles Klaus, chief sales engineer; Willard Kelly, head of private brand division; Walter Harvey continues as executive assistant to Mr. Schluter; Gene Carlquist continues as advertising manager with Russell Case as assistant and editor of *Thermoid News*; Matthew Winkler becomes division sales manager for the New York division, filling the position vacated by Mr. Dougal. The company's vice-presidents are Carl Schell, W. D. Pardoe, Lloyd Leaver, Frank Sharpe. George Fabel continues as president of the Southern Asbestos Co., a Thermoid subsidiary, and will be in charge of administration and policy of the parent company.

Injunction Against Hupp Board Denied

Petitions for an injunction to restrain members of the board of directors of Hupp Motor Car Corp. from acting as directors of the corporation were denied and the suits dismissed Saturday. One suit was brought by Frederick N. Dodge, the other jointly by Thomas Bracken and W. G. Fitzgerald, members of the former board, who claimed they never were legally ousted. Members of the new board had been named as defendants.

Hopkins Honored

David J. Hopkins, Yale, 1935, and son of Ben Hopkins, president of the Cleveland Graphite Bronze Co., has been elected to Phi Beta Kappa.

Third Quarter Steel Priced on Code Rate

AIS Report Shows Motors Consume 3/5 to 3/4 of Sheet and Strip Output

To all outward appearances harmony between buyers and sellers reigns supreme in the steel market. Following a meeting of steel producers, at which approximately 90 per cent of capacity was represented and at which resolutions were unanimously adopted to "continue during the present uncertainty the present rates of pay and maximum hours of labor and the standards of fair competition which are described in the Steel Code," the market became a strictly routine affair, with automotive consumers covering nearby requirements on the basis of third-quarter code prices.

Mild recession in the rate of ingot capacity employed this week, estimated by the American Iron and Steel Institute to have dipped to 39 per cent, compared with 39.5 per cent last week, was in no wise attributed to developments resulting from the Supreme Court's NRA decision, but in line with the down-trend in demand that set in in March. The leading producer's subsidiaries reported shipments during the first five months of the year of 2,975,891 tons compared with 2,693,558 tons in the corresponding period of last year and approximately half of the tonnage shipped in the first five months of 1930.

Emphasis on the important part played by automotive consumption in the arduous upward pull is given by the recent publication by the American Iron and Steel Institute of capacity and output during the first quarter of the year. In that period nearly three-quarters of sheet capacity and three-fifths of strip capacity were employed, these being predominantly descriptions of steel bought by automotive consumers, whereas less than one-fifth of steel-making capacity was needed to supply the demand for structural material and only about one-eighth to supply the railroads with rails.

Pig Iron—A fair volume of single carload business for June shipment is coming out, automotive foundries confining their purchases to nearby needs. There has been no deviation from the third quarter prices filed under the code. One of Ford's furnaces is down for repairs.

Aluminum—Market conditions are unchanged. Imports in the first quarter of 1935 exceeded 4,000,000 pounds, compared with less than 3,000,000 in the corresponding period of last year.

Copper—A meeting of producers and fabricators, scheduled for Tuesday to formulate policies under the changed NRA conditions, was postponed until Friday when it is thought that definite action will have been taken by the Congress with reference to what may and what may not be done by way of collective action of producers. Fabricating subsidiaries of producers are furnishing the best outlet for metal at this time. In the "outside" market the quotation for electrolytic copper has receded from 8.60c to 8 1/4c, delivered Connecticut, the "Blue Eagle" price remaining at 9c.

Tin—With the London market closed on

Buick is making an outlay of \$300,000 in the installation of a battery of drop hammers and heat treating furnaces that will produce up to 90 Buick crankshafts per hour. The drop hammers shown here weigh 200 tons apiece and the ram is capable of striking a mean effective blow of 200,000 pounds. The installation also includes six-ton hydraulic presses.



Monday because of the Whitsuntide holiday there, trading here was a nominal affair, spot Straits being quoted at 50 1/2c. The International Tin Committee is to meet at The Hague this week and to fix the quotas for the various producing countries, the expectation being that they will be increased by 10 per cent making possible output and export of half of the normal tonnage.

Lead—More steadiness prevails. One of the large marketers is curtailing sales at prevailing prices, while in other quarters slight concessions have been made.

Zinc—Mines in Oklahoma and Kansas are resuming operations under military protection.

Yellow Cab Experiments With New, Larger Taxi

The two sample taxis now being constructed by hand labor for the Yellow Cab Company of Chicago, company officials state, will be ready for inspection of the public in about 10 days. The fleet of 1000 new cabs to be constructed on the pattern of the experimental models are expected to be ready for use on Chicago streets by August 1.

Contracts for the new fleet have not yet been signed, but company officials say orders will be given to start construction shortly. The new taxis will be much larger than those in use at present. The new equipment will involve an expenditure of approximately \$1,000,000.

Rim Inspections Gain

The Tire and Rim Association reports the inspection of 1,561,434 rims during May, which compares with 1,140,132 for the same month one year ago. During the first five months of the current year 8,678,278 rims were inspected, against 6,478,987 for the corresponding period of last year.

City Pattern Works to Make Mallory 3 Casts

Vaughan Reid, president of the City Pattern Works, Detroit, has announced that his foundry has been licensed by P. R. Mallory & Co. to produce castings of Mallory 3, a new heat-treatable copper alloy. The company will supply castings of Mallory 3 throughout the United States and Canada.

At present the metal is being used for welding machine attachments, but it is expected to find other uses in automobile construction where an alloy possessing high heat conductivity is desirable. Mallory 3 combines the physical properties of structural steel with the electrical properties of copper. As cast, the material has 80 to 85 per cent of the conductivity of copper but features better fatigue properties and creep values. The yield point, as cast, is 35,000 lb. per sq. in. When heat-treated, the metal will harden to 130 brinell or somewhat higher.

"The Doctor's Special" Announced by Pontiac

Pontiac has announced "The Doctor's Special," a coupe fitted with medical equipment to take care of the needs of professional men.

A patented, portable medical case with space for carrying all of the instruments and supplies needed for residential calls is provided. This case fits into a special compartment, right back of the driver's seat. The case is so constructed and the compartment so arranged that all glass containers, bottles, etc., are held upright and secured by metal spring clips.

ASI Show Space Drawings Sept. 13

International Aspect Enhanced by Overseas Club's Sponsorship

Space applications for the 1935 Automotive Service Industries Show, to be held in Atlantic City, N. J., Dec. 9 to 13, were mailed during the first week in June to all eligible manufacturing members of the sponsoring associations.

According to A. B. Coffman, show manager, applications were issued early this year because of the many advance requests for complete exhibit information received from manufacturers since the time and place of the 1935 A. S. I. Show were announced. The space applications are part of a complete show prospectus which includes floor plans of the Atlantic City auditorium, rules and regulations, general information, and applications for all of the necessary special services for the largest annual booth show in the country.

Drawings for space will be held at the Sherman Hotel, Chicago, Sept. 13. To be included in the first drawing applications must be in Mr. Coffman's office on July 31. Applications received after that date, together with all applications from new members and those who have not exhibited at previous shows, will be included in the second drawing to take place immediately after the first. If any space is available after the two drawings, it will be awarded on a first-come, first-serve basis.

Official headquarters hotels of the three associations sponsoring the show are: N.S.P.A., the Ambassador; M.E.M.A., the Traymore; M.E.W.A., the Shelburne.

While representative overseas distributors of automotive maintenance products visit the show in good numbers each year, there

are indications that the 1935 show will take on more of an international aspect than ever before. Development of overseas attendance is being actively sponsored by the Overseas Automotive Club, which is issuing show information in several languages to distributors in all parts of the world.

The show will be closed to all but jobber members of the Motor and Equipment Wholesalers' Association and the National Standard Parts Association on the first three days, Dec. 9, 10 and 11. It will be opened to invited guest jobbers on the last two days, Dec. 12 and 13.

Carroll to Represent AMA at Paris Commerce Meeting

Charles R. Carroll of General Motors Export Corporation, has been designated to represent the members of the Automobile Manufacturers Association at the Eighth General Congress of the International Chamber of Commerce, Alvan Macauley, Association president, has announced. The Congress will take place in Paris, June 24 to 29.

Besides the number of general sessions devoted to the broader problems of the revival of world trade, the Congress agenda includes several items of special interest to members of the American automobile industry. Among these are: reciprocal tariff policies; coordination of rail and highway transportation and a proposal to have the metric system adopted internationally.

Auto-Lite to Build New Canadian Plant

Electric Auto-Lite Limited, Sarnia, Ont., plans to build within the coming year another factory in Sarnia, similar to the present plant, to handle increased business, according to J. A. Minch, of Port Huron, vice president and general manager.

Chicago Co. to Operate New Type Streamlined Bus

The Chicago Motor Bus Company has given final approval on the new type streamline buses which have been used experimentally for several months in regular service. Orders have been let to Yellow Motor Coach Co., Detroit, for 100 of the two-deck, 73-passenger buses, and 30 of the single deck type. Both types carry the engine in rear. Seats are tubular frame and of sponge rubber, springless construction.

Upholstery will be mohair plush in varied bright colors. A total of 548 of the new buses will be ordered over a period of three years, replacing 187 old single deckers and 363 double deckers, according to W. J. Sherwood, general manager.

Heil Co. Expands Plant

The Heil Co., Milwaukee, makers of motor truck bodies and hydraulic hoists, is spending about \$50,000 in plant improvements, including a new mounting plant for the installation of motor truck equipment to expedite production of these products for which there has been a considerable increase in demand.

MEWA Annual Conference

The fourth annual conference of representatives of regional organizations under the MEWA will be held at the Edgewater Beach Hotel, Chicago, June 24, 25, and 26. A meeting of the MEWA manufacturers relations committee will be held in conjunction with the summer conference of regional association representatives. There will also be a meeting of the board of directors at the Edgewater Beach Hotel just in advance of the summer conference.

April Wholesale Financing Reaches New High

In line with increases in field stocks, wholesale financing took another jump upward in April to a total of \$163,206,442 as compared with \$149,057,165 in March and \$122,967,488 in April of last year. In every month so far this year the volume of floor plan paper has exceeded retail financing by a substantial margin and the same was true in the corresponding months last year. These comparisons, of course, reflect the increasing dependence of dealers on finance companies for money to carry new and used car inventories.

The total of wholesale financing in the first four months, according to Census Bureau reports on 456 companies, was \$516,979,914 while retail financing in the same period was \$347,711,265. The corresponding figures last year were respectively \$326,693,526 and \$248,527,937.

Detailed figures follow:

RETAIL FINANCING (456 Identical Companies)

Wholesale Financing Volume in Dollars	NEW CARS												USED CARS			UNCLASSIFIED		
	Total Volume and Average			Volume and Average			Volume and Average			Volume and Average			Volume and Average					
	Number of cars	Amount	Per car	Number of cars	Amount	Per car	Number of cars	Amount	Per car	Number of cars	Amount	Per car	Number of cars	Amount	Per car			
April, 1935 ..	\$163,206,442	320,857	\$118,655,338	\$370	141,101	\$75,933,605	\$538	174,158	\$40,691,099	\$234	5,598	\$2,030,634	\$363					
March, 1935 ..	149,057,165	270,099	100,076,895	371	120,103	63,953,950	532	144,843	34,267,163	237	5,153	1,855,782	360					
April, 1934 ..	122,967,488	244,537	91,849,963	376	110,988	61,458,602	554	129,281	28,859,676	223	4,268	1,531,685	359					
4 months, 1935	516,979,914	937,616	347,711,265	371	412,238	221,493,096	537	507,472	119,716,289	236	17,906	6,501,880	363					
4 months, 1934	323,693,526	682,215	248,527,937	364	288,014	159,362,909	553	380,540	84,509,322	222	13,661	4,655,706	341					

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

Despite uncertainties growing out of the Supreme Court's NRA decision, trade was well maintained last week. Retail trade was benefited by the more seasonable weather, and the volume of wholesale orders was larger.

Freight Loadings Decline

Railway freight loadings during the week ended June 1 totaled 565,342 cars, which marks a decrease of 34,201 cars below those during the preceding week, a decline of 14,314 cars below those of a year ago, and an increase of 52,368 cars above those of two years ago.

Current Output Up

Production of electricity by the electric light and power industry in the United States during the week ended June 1 was 3.3 per cent above that in the corresponding period last year.

Farm Prices Make Gain

The index of farm prices on May 15 was 108, based on the 1909-14 average as 100, as against 111 a month earlier and 82 a year ago, according to the Bureau of Agricultural Economics. The index of prices paid by farmers for commodities they purchase stood at 128, as against 128 a month earlier and 121 a year ago.

Flour Production Steady

Flour production in the United States during May amounted to 4,975,434 barrels, as against 4,981,407 barrels during the preceding month and 5,160,516 barrels a year ago.

Crude Output Uneven

Average daily crude oil production for the week ended June 1 amounted to 2,575,900 barrels, as against 2,605,000 barrels for the week before and 2,453,400 barrels for the corresponding period in 1934.

Bituminous Mining Increases

Production of bituminous coal during the week ended May 25 amounted to 6,360,000 tons, which marks an increase of 485,000 tons above that in the preceding week.

Fisher's Index

Professor Irving Fisher's index of wholesale commodity prices during the week ended June 8 stood at 82.3, as against 82.3 the week before and 82.7 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended June 5 showed no changes in holdings of discounted bills, of bills bought in the open market, and of Government securities. Monetary gold stocks increased \$81,000,000 and money in circulation increased \$3,000,000.

Pontiac dealers delivered 72,465 cars or twice the number for that period last year. Sales executives expect deliveries to pass the entire 1934 total by the middle of June.

Buick

Buick retail deliveries in May were the largest for any month this year and exceeded any May since 1931. The total was 7,627 units compared with 5,245 in May last year, a gain of 45.4 per cent and 639 units in excess of the April figure. The month wound up with a sharp increase during the last 10 days when deliveries totaled 3,235 compared with 2,292 in the preceding 10 day period and 2,111 in the corresponding period of May last year.

Oldsmobile

With retail sales of 18,059 cars in May Oldsmobile showed a gain of 85 per cent over May last year, the final 10 days being 25 per cent ahead of the preceding 10 days and within 10 cars of the factory shipments for the period. By June 8 Oldsmobile dealers had sold more cars at retail than during all of 1934 and are believed to be the first dealer organization to achieve that distinction. The company still has unfilled orders for all the cars it can build this month. Inventories of its 3,000 dealers average less than 2½ cars per dealer.

Hudson-Terraplane

Counter to seasonal trend, Hudson and Terraplane retail sales in the United States showed an increase of 12.5 per cent during week ended June 1 over the preceding week which in turn had been 11.1 per cent better than the week before. The last three weeks of May showed increases over the preceding weeks. Further reduction has been made in dealers' stocks which on June 1 totaled 14,063 for all domestic dealers, compared with 23,792 on June 1, 1934. The company reports that stocks are in a well balanced condition.

Nash

Largely due to public acceptance of its new "400" line Nash reports an increase of 25.8 per cent in May sales over the corresponding month of last year and evidence of continued upswing is reflected in substantial orders being booked for the new cars by distributors and dealers. On June 1 orders on hand exceeded those of a year ago by 351 per cent.

Plymouth

Retail sales of Plymouth cars during week ended June 8 totaled 9,255 compared with 9,857 in preceding week and 6,960 in the corresponding week last year. For the first 23 weeks this year Plymouth retail deliveries totaled 185,481 against 133,124 in the like 1934 period, an increase of 39.3 per cent. With three weeks more to go, Plymouth deliveries easily will pass the 200,000 mark by mid-year. Registrations for all of 1934 were 302,557.

Chrysler

Chrysler dealers delivered 1,103 Chryslers and 3,732 Plymouths, a total of 4,835 units during week ended June 8. This compared with 1,144 Chryslers, 3,693 Plymouths and a total of 4,837 units delivered during the preceding week. Chrysler deliveries were up 94.2 per cent and Plymouth 55.6 per cent over the corresponding week of last year. Up to June 8 Chrysler dealers had delivered 20,061 Chryslers and 71,545 Plymouths, a total of 91,606 units or 51 per cent more cars than in the like period of 1934.

Graham

The last ten days of May were the biggest

Schedules for June Equal to May

(Continued from page 779)

Sales figures reported for the first week of June showed normal seasonal decline. The first reporting period of the month generally is lean so that sales executives are not at all disturbed by the recession, but based on field reports they are looking forward to higher figures in succeeding periods of this month. The feeling is that sales will hold at close to current levels well into the summer. As yet no important influence on sales of new cars has been traced to the lifting of code restrictions. Apparently dealers are not going "wild" on trade-ins, as some had feared when the code was killed. But it is still too early to form any definite opinions on this point.

May Registrations

New passenger car registrations for May in 15 states amounted to 45,206 as compared with 34,530 for the same states a year ago, an increase of approximately 31 per cent. If this same rate of increase is maintained throughout the remainder of the returns, car

registrations for May nationally should amount to about 286,000 units. This compares with 219,163 during May, 1934, and 319,652 during April of this year.

Based on a ten year average the seasonal sales for May should be approximately the same as for April. However, this decline of about 10 per cent from seasonal, no doubt, can be largely attributable to the inability of Chevrolet to deliver cars due to the strike that was in progress throughout the first part of the month. For the fifteen reporting states Chevrolet shows returns of 10,190 as against 10,398 a year ago, a decline of approximately 2 per cent.

In the fifteen reporting states Ford continues to maintain first place with 15,085 as against 10,419 during 1934, an increase of about 44 per cent. Chevrolet is second with returns as shown above, and Plymouth is third with 6,902 as compared with 5,395 in the same fifteen states during May, 1934, an increase of 28 per cent.

Pontiac

May retail deliveries of Pontiac cars totaled 16,902, or within 63 cars of the April volume which set a new record since 1929, and compared with 9,739 cars in May, 1934. In the first five months of this year

10 day period this year for Graham dealers who delivered 880 cars bringing the month's total to 2,247 and making May the best month for retail sales this year.

Ford

Retail deliveries for the year to date of Ford V-8 cars, commercial cars and trucks passed the half-million mark during the last 10 day period in May. May was the third consecutive month this year in which retail deliveries exceeded 100,000 units, it was said. The last 10 day period in May was the second best 10 day period for retail deliveries in the last five years. Retail deliveries in the first five months averaged better than 100,000 units per month. The total of retail deliveries of Ford trucks and commercial cars in the first five months was 66 per cent ahead of the total for the similar five month period last year and greater than the total for any other similar period since 1930.

Lincoln

Retail deliveries of Lincoln motor cars in the last 10 day period in May were greatest in volume of any 10 day period thus far this year.

Dodge

Domestic shipments of Dodge passenger cars for the first 5¼ months of 1935 exceeded the company's car production for the entire year of 1934. The total of Dodge passenger cars shipped to points in U. S. between January 1 and June 9 this year is given as 99,468, whereas the output for the whole year 1934 amounted to 99,466 Dodge passenger automobiles, and for the entire year 1933 to 87,103. In addition to the 99,468 Dodge passenger cars which were shipped in the first 5¼ months of 1935, the factory also shipped 27,825 Dodge commercial cars and trucks, and 64,362 Plymouths, a total of 191,675 vehicles.

Two New Turret Top Production Lines

The \$2,000,000 expansion program now in progress at the Pontiac Fisher Body plant will add 172,000 sq. ft. of floor space to the press shop, according to E. F. Fisher, general manager of the GM body division. Equipment will include two complete turret top production lines. Seven 250-ton presses are to be added, bringing the total of this type to 12 units. Six smaller presses will be installed for producing rear quarters and front end frames.

Larry Chittenden

Larry Chittenden, sales manager of the American Asbestos Products Co., Inc., died June 7 at Pontiac General Hospital of pleurisy. Mr. Chittenden, who also was a director of the American Asbestos Products Co., had been prominent in the motor industry for 25 years, having been at one time eastern divisional sales manager for Ford Motor Co. and at various times sales manager of Wire Wheel Corp. and Indiana Lamp Co.

Winners of Fisher Body Scholarships Get GM Jobs

The first two of the winners of the Fisher Body Craftsman's Guild \$5000 university scholarships were graduated this year and immediately given positions with the General Motors organization. The boys are



F. Willis Munro

New assistant advertising manager of the Graham-Paige Motors Corp.

Albert W. Fischer of Waukegan, Ill., and Raymond S. Doerr of Battle Creek, Mich.

Fischer, who attended the University of Illinois, will join the research division of the corporation, and Doerr, who was educated at the University of Michigan, has been assigned to the proving ground near Milford, Mich.

Special Police Department Model Announced by Buick

Buick has announced a special Series 40 "Police Department" model, which, according to W. F. Hufstader, general sales manager, is designed to meet the speed, performance and economy requirements of city, county and state law enforcement agencies.

The cars, according to Mr. Hufstader, enter production marked "police department specifications" and are built only to special order. The cylinder head has been redesigned, the valve mechanism altered and the gear ratio changed, thus increasing the top speed of these special cars to 85 to 90 m.p.h.

New Lincoln a 12, May be Priced Under \$1,200

The new lower-priced Lincoln, concerning which there has been so much speculation, will be a 12 and may be priced under \$1,200. Date of announcement is indefinite.

Ford's 2,000,000th V-8 Goes to Pacific Exhibit

The two-millionth V-8 Ford—the one-millionth Ford built in less than 12 months, and approximately the twenty-third millionth Ford ever built—was produced Thursday at the Rouge Plant of the Ford Motor Company here.

Henry Ford, founder, and Edsel Ford, president of the Ford Motor Company, watched the final assembly of the historic Ford. The car started at once on a 2700-mile journey to San Diego, Calif., where it will be placed on exhibit in the Ford Exposition at the California Pacific International Exposition.

The completion of 1,000,000 Fords in less than a year since the millionth V-8 Ford was manufactured June 19, 1934, recalled Mr. Ford's prediction late last year that the Ford Motor Company "would build better than a million in 1935."

Marmon Co. Reorganization Plan Reported Approved

Judge R. C. Baltzell, sitting in the Federal Court at Indianapolis, is reported to have approved the petition recently filed for reorganization of the Marmon Motor Car Co. under the terms of the Corporate Bankruptcy Act. F. A. Barnickol is understood to have been named temporary trustee and Carl Wilde appointed special master.

It is also reported that about 60 per cent of the creditors and debenture holders of the Marmon company have approved a plan which is to be filed in the proceedings by the American National Bank of Indianapolis as trustee.

Bauman Appointed White General Sales Manager

Robert F. Black, president of The White Motor Company, has announced the promotion of J. N. Bauman, assistant sales manager of the company, to general sales manager.

In his new position, Mr. Bauman will direct the sales activities of White through a world-wide sales organization of 80 direct factory branches and several hundred dealers. He succeeds George F. Russell, resigned. Mr. Bauman has been connected with White since 1922. Four years ago he was appointed manager of the sales promotion department, the position he held until becoming assistant sales manager a year ago.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Show—Cleveland...Sept. 11-21
New York Automobile Show, New York, Nov. 2-9
Detroit Automobile Show.....Nov. 9-16
Buffalo Automobile Show.....Nov. 9-16
Cincinnati Automobile Show.....Nov. 10-16
Automotive Service Industries Show—Atlantic CityDec. 9-13

CONVENTIONS AND MEETINGS

S.A.E. Summer Meeting—White Sulphur Springs, Va.June 16-20
American Society for Testing Metals, DetroitJune 24-28
National Industrial Advertising Association, Pittsburgh.....Sept. 18-20

American Transit Assoc., Bus Division, Atlantic CitySept. 23
National Assoc. Sales Finance Cos.—White Sulphur Springs.....Sept. 26-28
American Society for Metals, Annual Meeting—ChicagoSept. 30-Oct. 4
National Safety Council, Louisville, Ky.October 14-18
American Gas Association—Atlantic CityOct. 14-18
Los AngelesNov. 2-9
Newark, N. J.Nov. 9-16
American Petroleum Institute—Los AngelesNov. 11-14
PhiladelphiaNov. 11-16
BaltimoreNov. 16-23
National Industrial Traffic League—ChicagoNov. 20-21
Columbus, OhioNov. 23-28

British Plan to

AFTER years of discussion and negotiation between manufacturers and dealers, the British motor industry has evolved and adopted a National Price Protection plan; it displaces the scheme in force hitherto and broadens the scope of price protection by deciding upon and enforcing monthly trade-in figures for used cars of every model of every make of which at least 10 transactions have been reported during the preceding month.

As a preliminary to the adoption of this new scheme it was essential that every manufacturer should agree to assist in enforcing it. This requirement alone called for seemingly unending negotiation, and to secure its fulfilment it was necessary to reconstitute the Motor Trade Association, which hitherto had enforced a price protection scheme applying only to the sale of new vehicles and accessories.

Every manufacturer has now agreed to become a member of the association and to refuse to supply vehicles or

other products to any dealer who is not also a member of the association either by direct membership or through an allied association — such as the Motor Agent's Association, which is composed essentially and entirely of dealers.

The M.T.A. is now to be controlled by a council of 36 members; 18 of them British manufacturers and concessionaires of foreign manufacturers, 6 manufacturers of accessories and 12 retailers. Thus manufacturers secure control of a body originally formed by dealers. Every member of the association is subject to reelection each year and may be suspended or removed from membership at a general meeting or by the council without a reason being assigned, though he must be given seven days notice and an opportunity of giving reasons against his suspension or removal from membership.

Car manufacturer members have agreed to insert a clause in their agreements with contracting dealers that the latter must be members of the M.T.A.

and, in further consideration of the granting of their franchise, must sign a form of undertaking as approved by the council.

Beyond the council (elected annually) the organization of the association is now made up as follows:

1. A secretary, who must be a lawyer.
2. A permanent and independent chairman of the headquarters staff, to act as chairman of all committees having powers to investigate complaints received at headquarters.

3. Divisional or area committees, whose function it is to investigate complaints and infringements of the association's objects and rules alleged to have been committed by a dealer within the division. These committees, however, have no power to inflict penalties; they may issue warnings, but in serious or persistent cases they must refer complaints to headquarters for the attention of the committee there, which alone has power to take action by way of punishment upon the member who is proved to have offended.

4. A headquarters committee consisting of nominees of manufacturers and dealers in the proportion of two of the former to one of the latter. This committee is known as the "Price Protection Committee," and has a permanent chairman, who, however, has no vote. The total number of members of this committee is so large that their names will be placed upon a rota, so that not only will no one person have constant calls upon his time, but, as it will not be known which members are next liable to serve, there can be no possibility of members being canvassed to solicit favor or disfavor in connection with any case to be considered.

5. A permanent committee consisting of the permanent chairman and the secretary whose duty it will be to scrutinize the particulars of complaints received from divisional committees to ensure that in each instance there is a prima facie case demanding further inquiry and supported by definite evidence to come before the price protection committee.

The objects of the association to be furthered and enforced by the organization outlined are briefly as follows:

1. Generally to encourage and protect the motor industry and those engaged therein.
2. Especially to secure adherence to

APPARENTLY insurmountable legal barriers stand in the way of the application in this country of the plan of automobile price control just adopted in England, even if the American industry desired to get into anything of this sort. However, the plan is of considerable interest not only because all domestic manufacturers selling in England are affected by it, but also because of the efforts dealers in the United States are making currently to obtain manufacturer support for plans designed to make retailing more profitable.

Under the new British plan, the top allowance permitted on a used car is its average sales price less five per cent. Where a used car is in unusually good condition or has special accessory equipment, this top may be exceeded but the dealer must be prepared to justify his allowance. When it is necessary to liquidate an over-stock, manufacturers may give trading allowances and these allowances may be added to the top allowance.

For giving an excessive allowance, the dealer may be fined or his name may be placed on the "stop list" which means that no manufacturer is permitted to sell him new cars. This, of course, is equivalent in effect to cancellation.

The administrative agency is the Motor Trade Association to which all manufacturers now belong and which all dealers are required to join. Moreover, the manufacturers have agreed that they will require their dealers to sign an agreement covering the price control plan as a condition of receiving a franchise.

Makers and Dealers Join in Control Used Car Allowances

and compliance with the retail prices as fixed from time to time by manufacturers, concessionaires and vendors of motor cars, motor accessories and auxiliary motor goods.

It should be noted that the association does not fix the retail prices thus protected. They are fixed by the manufacturers concerned in open competition; but, having been so fixed, it becomes the function of the association to take such measures as will ensure that those prices are maintained, that they are neither exceeded nor reduced.

Arising out of this protection of retail prices comes the consideration of allowances given for used cars when new cars are purchased. The giving of an excessive allowance for a used car clearly constitutes an indirect method of reducing the retail price of the new one. So the value of used cars, other than those of a value exceeding £325, is therefore to be published monthly by the association in an issue known as "The National Used Car Price Book." This book is to state the maximum allowance that may be made, subject to a certain proviso which is referred to hereafter, for any used car within the above-mentioned price limit.

Association Is Enforcement Agent

It will be seen, therefore, that the functions of the association as now reconstructed fall under two primary headings:

(a) To compile and issue monthly The National Used Car Price Book, and
(b) To secure the adherence to the prices quoted in the Book, as well as to the other objects by the effective operation of the powers vested in the association by virtue of its constitution as a Trade Union. This permits of the publication of a "Stop List" which prevents any person or firm named thereon obtaining any motor cars or other price-protected motor goods. Provision is also made whereby money payments may be made by offending members instead of the more severe "Stop List" penalty.

It will therefore be an offence to offer or allow for a used car traded-in for a new car a price greater than that published in the issue of the National Used Car Price Book current at the time of the transaction, subject to the conditions defined in the National Price

Protection Undertaking agreement.

To minimize undesirable advertising it will be an offence to make any reference in advertisements to allowances for used cars beyond an intimation that part-exchanges can be arranged. No unused or demonstration car of a current model shall be offered, advertised or sold as shop-soiled at a price below the manufacturer's list price unless the manufacturer's consent has been first obtained. Introductory commissions are abolished and trade terms and commissions of any description on motor vehicles are to be confined to the names on the official list of car dealers.

Must Sell At Set Prices

It will be an offence for a member of the Motor Trade Association to supply directly or indirectly at other than the retail list price one or more price-protected new cars to a person or firm who is not a member of the M.T.A., though this will not apply to sales to those persons entitled to purchase for their own use (and not for resale), at a discount under the manufacturer's agreement concerned.

The National Used Car Price Book will contain a list of cars; against each will be found a price which represents the maximum allowance value for a used car traded-in in part-payment for a new car. Because of the difficulty arising from the divergent views of manufacturers and retailers, and because it is essential to the success of the scheme that the price to be observed must be fair to the public, it was considered that correct and acceptable prices could best be arrived at by basing them on the average prices of actual current sales. In order, therefore, to ensure strict accuracy and impartiality, there has been established permanent machinery for the collection,

collation and arrangement of the prices by a firm of accountants. A small committee of manufacturers and retail representatives has been set up to act in a consultative capacity to the accountants on technical matters only.

Each manufacturer is to make arrangements for not less than 50 and not more than 250 (unless special circumstances warrant otherwise) of his distributors and dealers to send to the accountants a true return of all used cars (by models) of that manufacturer's make which have been sold retail during the current month, with the prices obtained for each car. Each manufacturer will select the list of his own distributors and dealers and the selection is to be proportionately spread over the whole home territory so as to ensure a representative national return. These returns, rendered directly to the accountants, are to be strictly confidential and not available to any member or officer of the association for any purpose whatsoever. They are to be sent to, and remain in the hands of the accountants.

Having received the returns the accountants proceed to average the sale prices of the various models. After the average sale price has been arrived at, a figure of 5 per cent will then be deducted to allow for the handling and re-sale expenses of the purchasing dealer, and the resulting figure will be the one fixed to be protected in the National Used Car Price Book. In the event of there being less than ten sales returned of any particular model, the figure previously published (if any)

by M. W. Bourdon

British Correspondent, Automotive Industries

will be repeated and the returns allowed to accumulate until ten shall have been received, upon which the next figure to be published will be based.

The used car prices scheduled in the National Used Car Price Book will not apply to used cars in part-exchange for other used cars. Used car prices published will only include manufacturers' standard products as publicly listed and sold.

In the case of forward quotations involving the future exchange of used cars in part-payment of new cars (often called "Annual Replacement Contracts"), the allowances must be in accordance with the prices fixed in the Price Book current at the time delivery of the new car is effected.

One copy of the National Used Car Price Book will be sent monthly, free, to all car manufacturers and dealers who are members of the Motor Trade Association.

Plan in Dealer Contracts

The National Price Protection Undertaking is required to be executed by all distributors and dealers as a condition of their being permitted to hold their franchise from the manufacturer.

Manufacturers will also require their distributors and dealers to obtain similar undertakings from all sub-agents.

It is recognized that although the regulated prices may truly represent a fair average price, there are likely to be some exceptional cases where a particular car offered as a trade-in is in exceptionally good condition; it may be equipped with certain extra accessories, or a dealer may have a customer desirous of purchasing at a good price the very type of car offered, and for any of these or other good and sufficient reasons, a dealer might be able to allow for a used car a higher price than the figure given in the National Used Car Price Book and still be able to show that he has retained his full discount on the new car. In such special circumstances a dealer shall not be deemed to have committed a breach of the regulations and provision for such cases has been made in the National Price Protection Undertaking.

Another important point considered was how any scheme of protecting used car prices would be affected in those cases where a manufacturer decided it was necessary to liquidate certain models. It had to be recognized that a manufacturer, either by reason of a falling market, an over-estimate of potential volume, or some other reason, may occasionally be faced with surplus stock which he will be compelled to liquidate. It has for some time been accepted that one of the most successful ways of disposing of surplus stock without undue disturbance of the car market is for the manufacturer to dispose of his surplus cars to his accredited dealers at a higher discount than his usual rate, to enable his dealers to offer attractive prices for used cars taken in part-exchange. The al-

ternative method, i.e., reducing the list price, has not generally proved successful; it has two disadvantages—it disgruntles those customers who a short time before purchased similar models at full price, and the publicity it entails disturbs the used market price and so further depreciates all other owners' cars of similar model.

Since this situation must be accepted as a normal condition of the motor industry, it is recognized and is covered as follows: The National Price Protection Undertaking shall be in respect of all transactions involving the taking of a used car in part-payment of a new car on which the normal discount has been given by the manufacturer or distributor (viz., the regular discount laid down in manufacturers' agreements). In the case of any special models on which a manufacturer has temporarily increased his usual discount, a dealer will be permitted to add to the price fixed by the current National Used Car Price Book of the used car traded-in, a sum equivalent to the amount of extra discount received on the new car sold.

It will be seen that non-observance of the National Price Protection Undertaking will constitute not only a breach of one of the Association's major rules, but a breach of the manufacturers' agreement, on which latter breach the usual legal sanctions will follow.

In the following paragraphs is set out the procedure adopted by the association to deal with alleged infringements of this or such other rules as the council may decide to bring within such procedure.

Divisional Committee First Hears Complaints

Any member having reason to believe that an infringement has been committed shall send to the secretary at Headquarters (not the Divisional secretary), a complaint on a form provided for this purpose. The complaining member is required to send with this form a statement of the evidence not only on which he relies, but which he believes is available to support his allegation. No complaint will be considered unless submitted by the principal of a firm which is a member of the association.

On receipt of the complaint it is to be scrutinized by the secretary to ensure that it is in order and that there is some evidence to support the allegation. The secretary will then send those complaints of which he has approved, but without disclosing the identity of the firm making them, to the local Divisional Price Protection Committee concerned for action.

The trader against whom the complaint is lodged will be advised by the Divisional secretary by at least seven days' notice that the matter will be considered by the Divisional Committee, using only a standard form of letter, embodying an invitation to attend before the committee when it considers the matter. The evidence will be submitted to the committee in the presence of the trader against whom the com-

plaint is made if he is in attendance, but if he is not present, then the evidence may be considered by the committee in his absence.

The Divisional Committee will have no power to inflict a penalty of any description on a trader, but may administer a caution or take a written undertaking in the usual form to be sent to the Headquarters offices for filing. If the committee arrive at the conclusion that any particular case will not be met by a caution or undertaking, they will refer the complaint, with a full report thereon, to the Permanent Committee of the Association with a view to the case being brought before the Headquarters Price Protection Committee. During the hearing of the case by the Divisional Committee the trader originally complaining can be called upon to act as witness. No person (other than members of the committee and those immediately connected with the case) will be permitted to be present, except officers of the association and the party appearing in response to invitation and (during their examination only) any witnesses. The customer shall in no way be brought into the discussion. Both the chairman in discussion of the matter with the party appearing and members of the committee in discussing their decision shall have regard to the principles of British justice, which are briefly as follows:

(a) If any real doubt arises, the party appearing is entitled to the benefit of such doubt. No decision must ever be made on mere suspicion, however strong. (b) The party appearing must have fair opportunity of testing all evidence against him by cross-questioning and of giving rebutting evidence on points which he does not admit. (c) No complaining party will be allowed to vote. (d) If the party attends, all evidence and allegations of character, record, etc., should be given in his presence so that he may claim to deny or qualify such.

In determining a course to be taken to avoid reference of a case to Headquarters, the Divisional Committee shall take no course involving payment of money by the party appearing (either by way of re-purchase of a car, or refund of any amount involved or contribution to expenses, or under any other name) may be stipulated or accepted under any circumstances whatsoever.

Complaints received back at Headquarters for further action from local Divisions are to be referred first to the Permanent Committee to ensure that there is a *prima facie* case demanding further investigation or consideration.

Headquarters Committee Imposes Penalty

After being passed by the Permanent Committee, the case will come before a quorum of the Headquarters Price Protection Committee, whose composition has been explained above. The entire case is to be heard again and explained to the trader complained

against, who is then to be called upon to give, if he so desires, an explanation himself, or he may call other persons who have a first-hand knowledge of the transaction to do so on his behalf. Books of account, copies of originals of correspondence bearing on the case may be produced and inspected, and any acceptance evidence may be tendered and heard with a view to arriving at the truth of the transaction under consideration.

If the Headquarters Price Protection Committee finds that the facts adduced in the evidence prove that an infringement of the association's rules has been committed and that no satisfactory or acceptable explanation has been forthcoming, they will then proceed to consider the appropriate action to be taken as provided under the constitution of the association.

If, on the other hand, a satisfactory explanation is given by the trader complained against, a record to that effect is to be placed on the file and the matter closed.

Stop List Used

The power vested in the Headquarters Price Protection Committee of the Association, by virtue of its constitution as a Trade Union, to ensure compliance with its policy of price protection, is to cause the name of the firm concerned to be entered on the association Stop List, which is circulated as part of the price protection policy only, and has no reference to any other matter, and neither casts nor implies any reflection on the conduct, trade or standing of any person named therein. It will state that until further notice (and except under any contract already existing which the supplier is, by law, obliged to fulfil) the persons specified are not to be supplied directly or indirectly with any proprietary motor vehicles or proprietary motor goods.

Under appropriate circumstances an agreement may be entered into with the member concerned whereby, as a more lenient course, he makes a payment to the funds of the association.

Subject to such limitations and conditions as may be fixed from time to time by the council, any trader aggrieved with the decision of the Headquarters Price Protection Committee may appeal to an Appeal Committee of the council. The Appeal Committee is empowered to hear argument (but not further evidence unless special leave is given to do so); they may confirm the decision of the Headquarters Price Protection Committee to include the firm's name in the Stop List or they may enter into a new agreement for the payment of a like sum as previously arranged (if any) or for a greater sum or for a lesser sum, or they may merely caution the trader. Alternatively the Appeal Committee may order the case to be re-heard by the Headquarters Price Protection Committee.

A further and final appeal, subject to such limitations and conditions as may be fixed, is open to an aggrieved

member whereby he may appeal to the council itself, which will be heard (as to argument only and not further evidence) by a quorum of the council.

There are expected to be cases where complaints are received in support of which insufficient evidence is available to warrant bringing the case before the appropriate committee for action. The circumstances may, however, clearly indicate that the trader complained of is open to enter into transactions contrary to the association's approved policy. In other cases the receipt of a number of complaints may indicate that smoke does not exist without fire, and that while one or two complaints might be justly put down to coincidence, repetition could not be so ascribed. Such cases, therefore, are to be made the subject of investigation by a member of Headquarters staff, usually with a view to making a test purchase, thereby founding a case against the particular firm concerned upon the clearest possible evidence. Such investigations and test purchases are to be carried out only by specially chosen staff whose credentials have received the closest inquiry.

A further class of inspector, equally carefully chosen, is to be employed to travel throughout the country with a view to ascertaining, without making actual test purchases, whether or not the firms called upon are open to make deals contrary to the association's policy. Such firms will receive a confidential letter of warning, but no further action will be taken unless it appears from subsequent inspection or as the result of complaints that the warning has been disregarded.

The Terms of Agreement

The following are the terms of the Undertaking (previously referred to) that must be signed by every dealer or sub-agent to whom new cars are supplied for sale to the public:

"WE HEREBY UNDERTAKE that where an allowance is made for a used car by us in part-payment for a new car or chassis sold retail, the price that we offer or allow on such used car will not exceed the controlled figure fixed for similar models published in the National Used Car Price Book current at the time of sale, and in no event will we make an allowance to anyone which is higher than the price thus regulated except when either of the following two conditions apply to the transactions:

Two Exceptions

(a) If the new car that we are selling has been declared by the manufacturers in writing to be a liquidated model but is still a current model on the new car protected list, and has been purchased by us at a higher rate of discount than the manufacturers' regular terms of discount as laid down in the current agreement, we agree that in such a case we will not allow a price on the used car taken in part-exchange that is higher than the price published in the current National Used Car Price Book plus the amount of extra discount received by us on the new car sold.

(b) If we have definite knowledge, supported by documentary evidence, that we can sell the used car traded-in for not less than the price we allow for it, after making full allowance for the cost of any reconditioning which we may do to the said used car before re-sale, and adding 5 per cent of the allowance price for re-sale expenses. In such event we undertake to produce upon demand definite proof of the price at which the car was sold.

"This undertaking also applies in all cases of a used car purchased for cash either before or after we sell a new car to the same person within three months of the date of the first transaction."

Driver Signals

Editor AUTOMOTIVE INDUSTRIES:

I find the comments on Consumers' Research and various features of cars which you publish from time to time very interesting. All of us are looking for increased safety.

Many states require a car driver to hold out his arm and hand in various positions to indicate to other drivers that may be affected his intention to turn or change his course. With 1925 cars these signals were reasonably reliable and effective. With 1935 cars, the great majority of which are closed, with low seats and high window sills, the signals are hard to give and are

not reliable even when given by a conscientious driver. The value of all modern ventilating systems is spoiled when the window by the driver must be kept open to give signals. Many types of signals have been placed on the market, but have not been successful due to the fact they were not generally adopted. Why cannot the manufacturers agree on some signal that all can adopt and place on all new cars, and soon such a signal would be recognized by all state laws? This would bring increased safety for everyone and increased enjoyment to closed-car owners.

T. J. FLEMING.

Increased Power, Economy and Performance Claimed for Rotary Valve

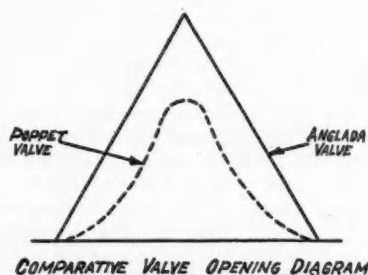


Fig. 1—Valve opening diagrams of Anglada rotary and conventional poppet valves

A TYPE of rotary valve for internal combustion engines, for which numerous advantages are claimed, has been developed by the Anglada Motor Corporation of New York, of which Joseph A. Anglada is president. In the course of development work on this valve a number of different designs were evolved, of which two have been definitely adopted as best meeting current requirements, one where engines of low cost and relatively small cylinder sizes are concerned, and the other for engines with larger cylinders and where minimum cost of production is not imperative. In both of these designs the valve is located in the cylinder head; in one it rotates at one-quarter and in the other at one-half crankshaft speed, around a horizontal axis, ordinarily (though not necessarily) parallel to the crankshaft axis.

Two important problems involved in the development of any rotary valve are those of an effective seal between the valve and its seat or tunnel, and of an efficient lubricating system, and it is Mr. Anglada's claim that it was the absence of satisfactory sealing and lubricating systems which prevented commercial applications of rotary-valve engines in the past. The main function of any internal-combustion-engine valve, of course, is to permit rapid flow of gases into and out of the engine cylinders. It is comparatively easy to achieve this by means of a rotary valve, which turns at constant speed and therefore causes the area of valve opening to increase at a uniform rate from

the time the port begins to open to the moment the maximum opening is reached, and also to decrease at a uniform rate during the closing period. This is in sharp contrast to conditions obtaining where poppet valves are used, with which the rate of opening must be increased gradually from zero, and the rate of closing gradually decreased, lest the valve action be rough and noisy.

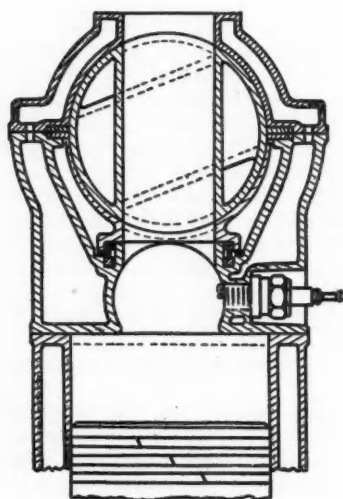


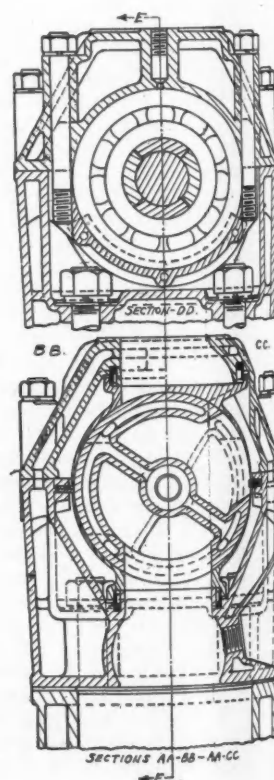
Fig. 2—Transverse section through rotary valve rotating at one-quarter crankshaft speed

Fig. 1 herewith is a comparison of a valve-opening diagram obtainable with an Anglada rotary valve, with that obtained with the conventional poppet valve. In the diagram, vertical distances represent instantaneous areas of opening and horizontal distances degrees of crankshaft rotation (which latter for a given engine speed are proportional to time). It will be seen that the maximum opening area is more than 50 per cent greater in the case of the rotary valve.

It is interesting in this connection that in one particular case where the Anglada valve was adapted to a stock engine, at the request of the manufacturer of this engine, the maximum area of opening was made the same as with

the poppet valve, yet there was a slight increase in output, which no doubt was due to the more rapid opening and closing of the rotary valve and possibly also to the greater directness of the path of flow through it. One advantage claimed for the rotary valve in this connection is that timing of the valves is not affected by wear. There is, of course, a possibility of a slight change in timing due to wear in the valve driving gear, but this would be small compared with the change in timing possible with poppet valves operated by cams with very "slow" ramps, used for the sake of quiet operation.

Fig. 2 is a sectional view through the simpler of the two valve designs, which is recommended for quantity-production engines. It will be seen that the cylinder head is in two parts, both of which are water-jacketed. The cylindrical rotary valve bears directly on the bore of the upper half of the head, which serves to locate or guide it. For each



and Smooth, Quiet Rotary Valve Design

by P. M. Heldt

Engineering Editor,
Automotive Industries

cylinder there is one exhaust passage and one inlet passage through the valve, these passages being offset axially to prevent interference with each other, and angularly in order to meet timing requirements. At the bottom the valve is supported by a shoe which serves the purpose of effecting an elastic seal between the valve and its bore. The shoe is of cast iron and is not unlike a brake shoe in form, except for the fact that it has a large cylindrical boss at the center, which is bored out to permit of the passage of gases from and to the valve. A photograph of half of one of these valve shoes is shown in Fig. 3, with half of the sealing ring in place. The shoe is pressed against the valve by the gas pressure in the cylinder. For the most effective seal it is necessary to

have a fairly high specific pressure on the sealing surface, and to obtain this, the surface of the shoe toward the valve is relieved over the greater part of its area. It has been found that an initial pressure of 10 lb. per sq. in. between the sealing surfaces of the valve and the shoe is necessary to provide the initial seal against cylinder vacuum and pressure at the beginning of the compression stroke. Cylinder pressure,



Fig. 3—Sectioned view of valve shoe and sealing ring

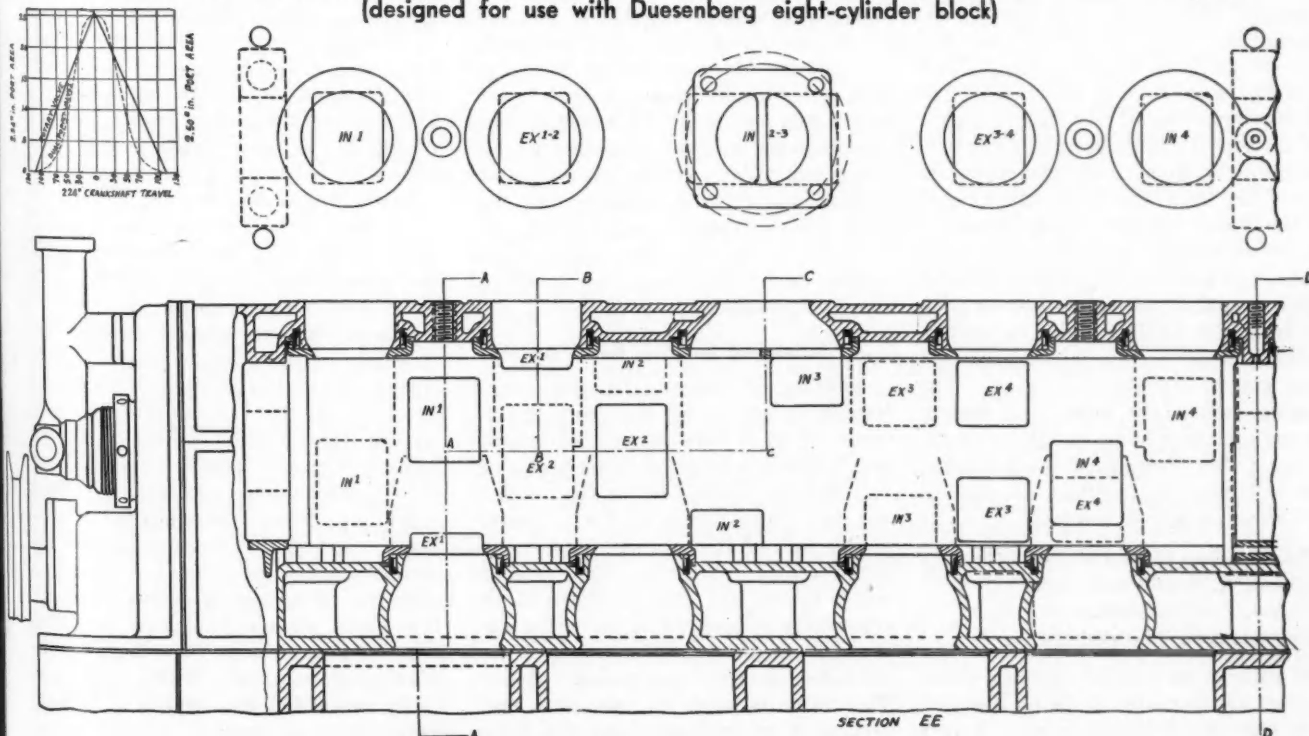
pressing against the bottom of the counterbore in the boss on the shoe,

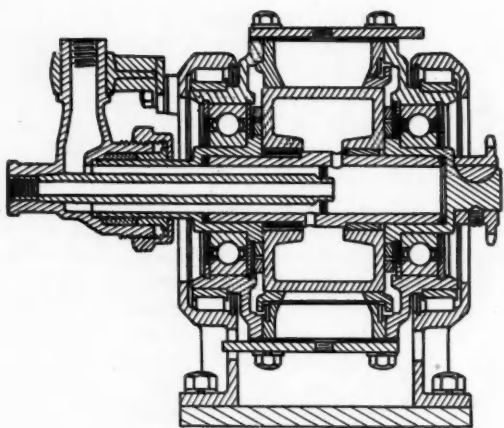
forces the shoe against the valve. To reduce the friction between shoe and valve, the pressure between them must be controlled. Experience indicates that the unit pressure between shoe and valve should be about 46 per cent of the unit gaseous pressure in the cylinder. If the pressure between shoe and valve is less than this proportion, there is a tendency for leakage past the valve, whereas if it is greater, the friction between valve and seat is greater than is desirable. Therefore, if the mean pressure in the cylinder is 100 lb. per sq. in., the pressure between the sealing surfaces of valve and shoe should be 46 lb. per sq. in.

It will be noticed from the sectional view, Fig. 2, that there is a sealing ring between the lower part of the cylinder head and the valve shoe. This ring, which is set into a recess turned in the cylinder head, is formed with a thin-walled extension that is a light press fit in the counterbore of the valve shoe. The arrangement shown by Fig. 2 is somewhat different from that shown in Fig. 3, as in the former the sealing ring is set into a recess cut in the cylinder head, while in the latter it is set into a counterbore in the head.

For the proper operation of the valve it is required that a film of lubricant of fairly uniform thickness be maintained on its rubbing surface at all times. Too much oil would result in the same troubles as in poppet valve engines, viz., carbon formation on the cylinder wall and a smoky exhaust, while too little oil would impair the seal of the valve and

Fig. 4—Transverse and longitudinal sections of rotary valve rotating at one half crankshaft speed (designed for use with Duesenberg eight-cylinder block)





might possibly cause seizure. The means provided for lubrication is another feature of the Anglada rotary valve. As shown in Fig. 2, grooves of rectangular section are cut in the bore of the cylinder head (in this case at the joint between the upper and lower sections), and two thin bars of steel are inserted which are a fairly snug fit in the grooves. A line from the engine pressure lubricating system is connected to the bottom of these grooves so that the space behind the bars is always filled with oil under pressure as long as the engine is running, and the bars are pressed against the outer surface of the valve with a force proportional to the pressure in the lubricating system. A point which cannot be seen from the illustration is that the inner or facing sides of the two bars are slightly relieved over their outer half, so that the oil has easy access to the space between them and tends to force the bars apart and against the sides of the groove. By reason of the pressure on the oil and the capillary action of the narrow space between the bars, oil is constantly supplied to the surface of the valve. The specific pressure of the bars against the valve is the same as the pressure in the oiling system, and this serves to control the thickness of the film formed on the valve. The rubbing speed of the valve on the sealing shoe is equal to about 55 per cent of the piston speed.

For the valve and valve shoe an alloy cast iron with a fairly high total carbon content, which assures a relatively large graphite content, is used. The alloying metals are nickel and molybdenum, and they have the effect of ensuring a fine division of the graphite. The following composition is said to have given excellent results:

Total carbon, 3.30-3.50 per cent.
Silicon, 1.75-2.00 per cent.
Nickel, 2.00 per cent.
Molybdenum, 0.50 per cent.

To relieve the cooling stresses, these castings are annealed by being brought up to 1000 deg. F. in one hour and then

allowed to cool slowly. Thus annealed, the castings show a hardness of 220-260 Brinell, which permits of easy machining. By heat-treating the shoes, their hardness can be increased to 450-500 Brinell, which necessitates finishing by grinding. Such heat treatment has been found unnecessary, however, as satisfactory wearing properties can be obtained with the shoes merely annealed for stress-relief purposes, when they show a Brinell hardness of about 250.

Fig. 4 is an example of the more elaborate design referred to in the introductory paragraph, this particular one being adapted to the Duesenberg eight-cylinder in-line engine. It differs from the design shown in Fig. 2 in several respects. In the first place, whereas in the former the ports or passages extend straight through the valve, so that each passage repeats its function after half a revolution of the valve, the gases passing through the valve alternately in opposite direction, in the design shown in Fig. 4 the two ends of the passage through the valves are not directly opposite each other, hence only one end of the passage comes into registry with the cylinder port, and the exhaust, for instance, always passes through the valve in the same direction. This means that the valve must make one revolution for every cycle of the engine and must therefore rotate at one-half crankshaft speed.

Mounted in Ball Bearings

Another difference is that the valve is located or guided by ball bearings, instead of by a bore in the valve head, and is almost completely surrounded by two floating shoes. Since the valve is not in direct contact with a water-cooled wall of the cylinder head, it has to be cooled internally. The internal water spaces are clearly shown in the transverse section, while the water connections to this rotating member are indicated in the longitudinal section. This valve is made in two parts, each serving four cylinders, the two being

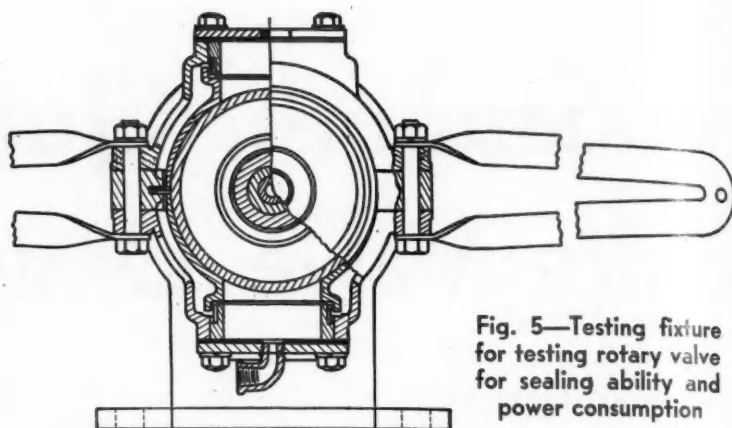


Fig. 5—Testing fixture for testing rotary valve for sealing ability and power consumption

connected in driving relation by a jaw coupling.

Fig. 5 shows a testing fixture which has been used in the development of this valve. It comprises a housing somewhat similar in shape to the cylinder head forming the valve housing, which is mounted in roller bearings in brackets secured to a base plate. This permits of measuring the torque on the housing due to the drag of the revolving valve. Within this housing there are two floating valve-sealing shoes, and these surround the valve, which is carried on a hollow shaft mounted in ball bearings in the housing. Air under pressure is admitted to the ports above and below the valve, which latter is a blank, that is, it has no valve passages through it. The interior of the hollow valve communicates with the interior of the hollow shaft, to the end of which a pressure gage or a gasometer can be connected so that the leakage can be gaged by the pressure gage or read from the gasometer. It is stated that tests with this fixture have shown that the valve may be operated at a peripheral speed of 4500 ft. per min. with the shoe sealing against an air pressure of 300 lb. per sq. in. between valve and shoe, the valve being maintained at a temperature of 350 deg. F.

It can be seen from the sectional views shown that the combustion-chamber obtained with this type of valve is of rather compact form.

Among the advantages claimed for this type of valve by the concern sponsoring it are the following: Increased specific power, low operating cost, smooth vibrationless operation at all loads and speeds, positive valve timing at all speeds and continuously silent operation. These are operating advantages. From the standpoint of the manufacturer the valve is claimed to offer the advantage of comprising only few parts, of simple design, made of low-cost materials by inexpensive manufacturing processes, which parts are easily assembled and require no adjustments after assembly.

JUST AMONG OURSELVES

Accept Cut to Give Others a Raise

WHERE men and management have each other's confidence, some amazing things can happen.

Recently, in one of the most completely organized plants in the automotive industry, the management desired to balance the wage rates of productive and non-productive workers. There were over 5000 of the former receiving an average of 80 cents per hour against about a fifth as many of the latter averaging 64 cents hourly. The management did not feel that it could afford to increase its total payroll without increasing prices and higher prices meant lower sales.

So it proposed that the productive workers take a 2 per cent cut so that the non-productive workers might have a 10 per cent increase. The union committee didn't think the men would accept this proposal but agreed to put it to a vote. They did. The balloting was practically unanimous in favor of acceptance, only one-half of 1 per cent voting against the proposition.

* * *

Legal Solutions of Economic Problems

IT seems improbable that the NADA will be able to get the car makers to adopt the revisions in dealer contracts which the association is currently urging. Regardless of the merits of these proposals, they represent too big a break from present practices to expect their early acceptance.

The dealers would continue the code principles of used car con-

trol by writing into their contracts with the factories a provision that allowances must not exceed the Guide Book and that willful violation of this provision would be cause for cancellation. This procedure would be of doubtful legality, and moreover it is questionable that it would result in any more effective enforcement than NRA gave, since for obvious reasons factories would hesitate to cancel on these grounds. In this connection it is interesting to note that GM President Sloan, in commenting on the dealer proposals, views liquidating damage agreements as more practical. He says he is anxious to work out a provision in dealer contracts for such agreements and that he is advised that this arrangement would be legal, except perhaps in some states.

Failure to maintain new car prices would also be made cause for cancellation, and here again legal difficulties loom. Other items in the NADA proposals provide for no changes in discounts during the period of the contract, 50-50 sharing of fleet discounts and of losses through clean-up price reductions, mark-ups equal to car discount on all items in the delivered price except taxes, shipments on firm order only, etc.

On cancellations, where the manufacturer terminates the contract without cause, he would be required to repurchase new car and parts inventories, assume unexpired leases entered into with his approval and take over contingent liability on outstanding instalment paper. The manufacturer would not have to assume these responsibilities for cancellations because of used car chiseling or new car

price cutting. He would have to assume them, however, where he put a new dealer into an existing dealer's territory, if the latter chooses to give up his franchise.

If all these changes were made in dealer contracts and they had their intended effects, it is quite possible they would work a marked improvement in the dealer's position, although they might have other consequences not so salutary. However, we have doubts that even if the factories did the improbable by adopting them, the intended effects would materialize. We haven't too much confidence in legal solutions of economic problems—whether by legislation or by contract. It is the intent that counts most in these matters, and intent is determined largely by how well one appreciates where one's real interest lies.

* * *

Code Used Car Savings

FACTORY figures on dealer used car losses indicate that the motor vehicle retailing code was dead so far as the used car marketing rules were concerned at least three months before the Supreme Court knocked out the whole NRA structure. At the start, compliance with the code resulted in marked reductions in losses, but along in the fall of last year savings commenced to narrow and continued to do so until they entirely disappeared in the spring of this year.

* * *

SOME statistics on the man-hours of labor per ton of steel produced recently developed by the Department of Labor, coupled with data on automotive consumption of that metal, indicate that each motor vehicle produced provides somewhere between a week and a half and two weeks of employment in the steel industry.

—D. B.

Modern Equipment Gives

Quality in the

by Joseph Geschelin

Detroit Technical Editor,
Automotive Industries

ALTHOUGH quill bearings in which the rollers have a large ratio of length to diameter have been used for years, only recently have they assumed huge stature, and according to an estimate made in H. D. Allee's recent S.A.E. paper, practically one billion rollers will be absorbed by the automotive industry in 1935.

What is the background of this phenomenal change in design habits? It rests first upon the development of quill bearing construction incorporating heat-treated rollers and race members of high-grade steels capable of carrying the recommended loads without failure and without measurable wear. Secondly, it is associated with the related factors of bearing-precision, rapid production, and low production costs. These elements are interdependent and yet were commercially unattainable until the introduction of modern production equipment such as the centerless grinder and other special

techniques which have been developed recently.

Further stimulus to applications of quill bearings in automotive construction has come from the comparatively recent development of a proprietary machine which assembles the rollers in their retainers, automatically and with great speed. One installation made by Rehnberg & Jacobsen, makers of this machine, loads eight assemblies per minute of 50 rollers per assembly.

Through the courtesy of the Bantam Ball Bearing Co., South Bend, Ind., reputedly the largest producer of quill bearings in this country, we are permitted to give our readers at least a quick impression of how these rollers are produced as well as to show some examples of unusual mechanical ingenuity involved in the process. For a thorough discussion of the design elements and applications of quill bearings we recommend a reading of H. D. Allee's paper, "Quill Bearings—Past,

Present, and Future," which he presented in April of this year.

We can start our inquiry with the appreciation that this company's success in the automotive business is founded upon the ability to produce rollers of controlled quality, with high precision, in great volume at low cost.

All quill bearing rollers made by this company are fabricated of S.A.E. 52100 ball bearing steel, heat treated under specified and controlled conditions. Heat treatment is accomplished in electric furnaces or atmospheric controlled gas furnaces of the automatic rotary type. Hardness is held precisely between a range of 57 to 60 "C" Rockwell which yields a highly ductile structure. In fact the company recommends a bend test to prove this and all acceptable rollers will take a permanent set without breaking. Hardness tests for the purpose of inspection are taken on flats 0.020 in. wide ground at two points on diametrically opposed sides.

Bantam rollers are made in a range of sizes from 1/32 to 1/2 in. diameter. On rollers from 1/8 in. diameter up the manufacturing tolerance is held within plus 0.0000 and minus 0.0002 in.; on taper in the length—plus or minus 0.0001; eccentricity in 180 deg.—plus or minus 0.0001 in.

On plain rollers with spherical radius ends and rollers which have spherical ends, all sizes from 1/32 to 1/2 in. diameter are cut off to length on punch presses such as are shown in the battery in Fig. 1. Small sizes are fed from reels while the large diameters are fed in by hand from bars. While the presses outwardly are standard in every respect, certain modifications have been made to suit this operation. This will be evident from the fact that the small

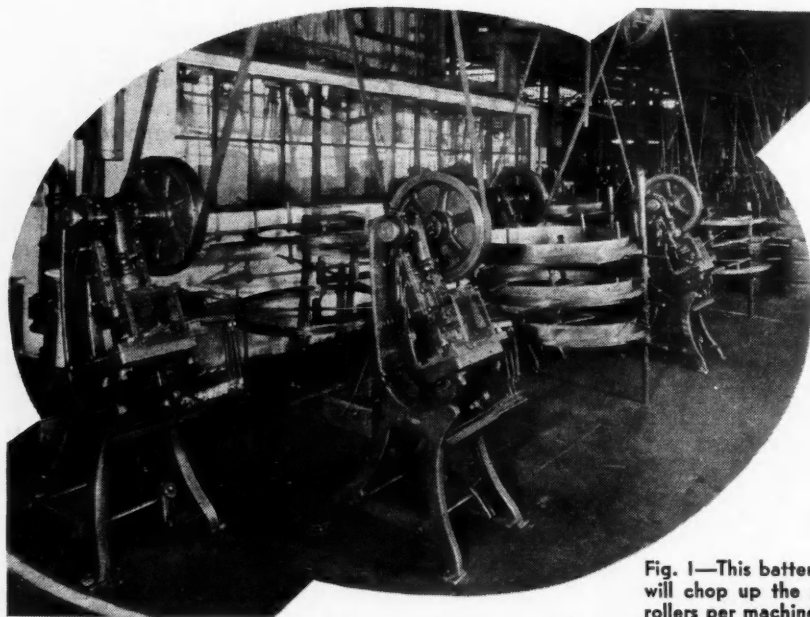


Fig. 1—This battery of presses as tooled up by Bantam will chop up the stock at the rate of at least 60,000 rollers per machine per hour. The trick is in the tooling.

Quantity and Economy Production of Quill Bearings

machines shown here will cut off at the rate of 100,000 and better per machine per hour.

The real secret of the job lies in the design of the shearing tools. We don't know the construction of the tools but we do know that the rollers come out pretty close to finished length and with fairly well shaped ends rather than just sheared edges.

After cutting to length, the rollers that have spherical ends like dumbbells are cold headed in the most amazing fashion. You would expect that cold heading where the head requires a considerable degree of upset would demand the use of a heading machine of some kind. But that isn't how it's done here. Instead, the rollers are dumped into huge tumbling barrels designed for the purpose and after tumbling for a specified interval they are taken out. The remarkable thing is that when they come out the ball ends are well formed and fairly symmetrical so that they require very little metal removal.

Next comes the heat treatment which has been mentioned earlier. This is followed by various tests for hardness, ductility, microscopic examination for fissures, and impact tests.

The rollers now are ready for grinding on the battery of Cincinnati Centerless machines shown in Fig. 2. Looking at the machine in the foreground, the mechanism to the left and above the machine proper is a hopper feed which shoots the rollers to the automatic in-feed grinder mechanism through the small tube that runs from the hopper to the machine. This magazine feed was designed and patented by Bantam and was responsible for speeding production within a range of 50,000 to 150,000 rollers per hour per pass. Multiple

passes are employed for roughing and finishing to produce the tolerances mentioned earlier. Inspectors are stationed at the outlet end of each grinder and check the various dimensions right through the day's run.

Following centerless grinding the rollers are lapped to the finish specified by the customer—either a luster finish or satin lap. In addition to using a mechanical lapping machine, Bantam has found it possible to produce a beautiful finish by tumbling in an inclined barrel using known combinations of rotative speed and lapping compounds for the production of the given finish.

The work then is cleaned to remove oil and grease in automatic cleaners and proceeds to the final inspection bay, Fig. 3. This is a 100 per cent visual inspection under a magnifying glass for visible defects, a certain percentage of the lots being rechecked for length, size, hardness and ductility before releasing to the shipping department.

Bantam has been called upon recently to produce a considerable volume of formed end type rollers for certain new applications. These include cone ends, trunnion and ball ends. This type of work presents a more difficult production problem and the best methods developed to date still do not approximate the speed and low cost with which the regular line of rollers is fabricated.

At present the formed end rollers are formed and cut off on a battery of Brown & Sharpe automatics tooled up for the purpose. Compared with the methods previously described, this is a costly process since the highest production rate they have been able to attain runs between 1500 and 3000 rollers per hour per machine, depending upon the type of end, which is excellent performance for this type of equipment.

Today experimental work has been completed and a new battery of machines of an entirely new type are going into production to manufacture



Fig. 2—After heat treatment the rollers are ground to size in successive passes through Cincinnati centerless grinders. Featured here is Bantam-patented magazine feed that helps step up production to 50,000 to 100,000 rollers per pass per hour per machine.

Fig. 3—Group of girls in final inspection department looks them all over under glass for visible defects, if any. A certain percentage is rechecked for dimensions, hardness and ductility.

"formed end" rollers at a rate of five times the foregoing. At the same time these machines will produce roller "ends" having a length and shape accuracy impossible of attainment by any known type of automatic screw machine.

The foregoing is just a fragmentary view of a remarkable manufacturing plant. Everything about it suggests mechanical talent of no ordinary calibre. The most outstanding features of the operation might be summarized as comprising the ability to produce a high-grade product, with controlled characteristics, in great volume, at a price that has made it possible to change the design habits of automotive engineers.



Industry's Accident Frequency Rate Higher in 1934

THE 1934 accident frequency rate in the automobile industry was 9 per cent higher than that of 1933, while the severity rate was 13 per cent higher. This is shown in figures just issued by the National Safety Council.

"These figures," the Council explains, "are based on reports from 57 automobile and parts manufacturing plants, whose employees worked 216,346,000 man-hours. They may be compared with 5 per cent increases in both rates for all industries.

"The automobile industry averaged 22.24 for frequency, in comparison with 16.29 for all industries, and 1.28 for severity, as compared with 1.70 for all industries. The injury frequency rate is determined by the number of disabling injuries per one million man-hours of work, while the severity rate is based on the number of days lost through disabling injuries, per thousand man-hours of work.

"The automobile industry ranks 23rd in frequency and 12th in severity in the Council's list of 30 major industries.

"There has been no improvement in the automobile industry in the fre-

quency of death and permanent total disabilities, although large reductions have been made in the frequency and severity of temporary disabilities. Thus, the 1934 frequency rate for death and permanent total disabilities, .06, represents an increase of 257 per cent in frequency since 1926, while the severity rate of .39 represents an increase of the same percentage. Permanent partial disabilities in 1934 had a frequency rate of 1.02, with an increase of 21 per cent since 1926, and a severity rate of .60, with a decrease of 13 per cent. Temporary disabilities had a frequency rate of 22.24, with a decrease of 33 per cent; and a severity rate of 1.28, with an increase of 4 per cent.

"The experience of large and small groups may be compared in these figures: Large plants had a 1934 frequency rate of 20.52, representing an increase of 15 per cent over the 1933 rate, and a severity rate of 1.33, representing a 25 per cent increase. Small plants had a 1934 frequency rate of 21.79, representing a 22 per cent increase over the same rate for 1933, and a severity rate of 1.06, represent-

ing a 28 per cent decrease over the rate for the previous year.

"The 1934 experience of various kinds of plants is reflected in these figures: Automobiles, 15.66 in frequency and .95 in severity; automobile parts, 20.66 in frequency and 1.84 in severity; automobile bodies, 28.12 in frequency and 1.14 in severity; automobile stampings, 42.38 in frequency and 2.26 in severity. Automobiles, automobile stampings and automobile parts experienced these increases in frequency rates respectively: 11 per cent, 15 per cent and 26 per cent. Automobile bodies had a 2 per cent decrease in frequency rates. The following increases were made in severity from one year to the other: automobile bodies, 5 per cent; automobiles, 10 per cent; automobile stampings, 25 per cent, and automobile parts, 18 per cent.

"The frequency of disabling injuries in the industry has decreased 33 per cent since 1926, in comparison with a reduction of 57 per cent for all industries; in severity there has been an increase of 4 per cent, against a reduction of 37 per cent for all industries."

The Option Problem Gets Steadily More Difficult

WHILE the car buyer is the kingpin and is permitted to dictate the details of his purchase, many, many headaches are transmitted right through every channel of automobile distribution and production. With the subtle but accelerated growth of options of every description—color, wheels, trunks, radio, cigar lighters, upholstery, and literally scores of other things—the industry is faced with rather serious repercussions beginning at the production line.

Options have raised havoc with the once vaunted scheduling arrangements at the factories. For example, one low-priced car builder, who several years ago had a scheduling department so flexible that his assembly line could be scheduled hourly, now finds it necessary to run the cars in batches, so many sedans, so many coupes, so many roadsters, etc., and then pick from the day's output enough variety to fill the orders on hand.

As a result we find a rapidly accumulating bank of vehicles which have to be stored and which do not necessarily meet the requirements of dealer's orders.

The Problem Is Involved

At the moment the whole thing is enmeshed in a web of circumstances. On the one hand the public has been encouraged to ask for what it wants, at a price if need be; on the other hand there is the problem of supplying this demand what with complications at the factory that make it difficult to make deliveries without great delay. The dealer gets business because he caters to the whims of his public, but he may frequently lose the order because the buyer is unwilling to wait, particularly if a competing dealer can take care of him in a hurry.

We had occasion to discuss this very point several years ago—*Automotive Industries*, Oct. 22, 1932—in an article entitled, "Dealers Claim Factory Options Cut Their Profits." It's much like the age-old question of which came first, the hen or the egg. Do the dealers suffer because the factories permit and encourage options, or do the

factories suffer because the dealers demand options in order to sell cars?

What the answer is—we don't know. Neither have we been fortunate enough to find someone who has the right answer. But there's the setting and it deserves some intelligent consideration.

The Sunday supplements a while back carried a story to the effect the Auburn line offered the public at least 4000 combinations without running into special equipment such as windshield wings. If some of the buyers wanted the extras, the number of combinations obviously, would be doubled, trebled, and what have you.

Wide Range of Combinations

Now Auburn is by no means unique in this respect. To prove it we ran through the dealer literature for a number of other representative lines and made very rough estimates of the combinations of options offered by them. Although these figures are rough and incomplete because of the difficulty of nailing all the options, they are at least indicative of the trend.

Here is how they line up:

	Combinations
Chrysler Airstream and	
Airflow	— 4680
Buick 40, 50, 60 and 90.....	—39,000
Graham, entire line	— 2000
Hudson and Terraplane.....	—15,000
Nash and Lafayette.....	— 8400
Packard, entire line.....	—40,000
Pontiac, sixes and eights.....	—40,000
Studebaker, entire line.....	— 8000

Let us remember that these are just rough estimates, maybe high in some cases, maybe too low in others. However, that's beside the point. What counts is that the number of combinations is tremendous and probably far higher than anyone realizes.

The significance of the figures is that a car builder may start the season with the idea of building say three models, each comprising five body styles and then wind up with the prospect of producing say 5000 different automobiles at any given time.

Clearly, instead of volume produc-

tion of standard cars, we have had custom tailoring even on cars in the lowest price class.

So long as options were restricted to wheels, color, and fender wells, the problem was by no means serious so far as the factory was concerned since these details are readily controlled by planned scheduling. It's the smaller detail that gives trouble.

We discussed this with one of our friends whose job it is to get out production in the trim shop. It has become so complicated that ofttimes he has felt that there were a couple of million variations and each one means a different automobile.

Take a simple case. A dealer orders a car—absolutely standard—except that it is to be fitted with a cigar lighter and special door handles or perhaps a right hand windshield wiper. It sounds simple, but when the cars come down the line one of the jobs has to be spotted for fitting with these details. Remember that the speed of the assembly line is adjusted to standard operations that take a known interval of time to perform. If any one step lingers too long it balls things up. As a result the cars that require special handling may have to be taken off the line, moved over to one side, and have the drilling and tapping and whatnot done more leisurely.

Pushes Costs Up

This costs more money but since the practice is to bulk all costs in this department, the extra cost is distributed over the entire production, thus making it seem that the cost of options results in a profit to the department. Actually the assembly cost per day is higher than it should be by so many pennies or dollars.

Another serious implication of options is that it is most difficult to plan a regular production schedule on medium and low-priced cars where volume in every department is essential to the price structure. It is not uncommon today to find that despite banks of cars in storage and lots going over the lines, it is most difficult and

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Machinery's Contribution to the

Higher Wages for More Workers, Greater Production, Lower Prices, Wider Distribution of Better Products

by Joseph Geschelin

Detroit Technical Editor,
Automotive Industries

TECHNOLOGICAL change has been so swift that even some of the more enlightened have sometimes had misapprehensions as to the sociological implications of the machine. While it is impossible to discuss mechanization in all its ramifications within the limitations of a short article or even a lengthy book, there are some general features deserving of more than passing interest which may be here set down.

In the first place, it can be said that management recognizes the sociological aspects of mechanization. No one today buys equipment simply to speed up production or to eliminate labor. There are many other reasons why the progressive manufacturer must take advantage of improvements in mechanical equipment.

The buying public, and that includes the men who make the products which are sold, must find better value, better performance, longer life, in the commodities which they buy. And, for a wider distribution of these things, prices must be consistently lower. How can this be done except with the aid of progressively modernized production equipment?

Cost-reducing equipment makes it possible to spread the benefits of modern industry to an ever increasing percentage of our population. Historically we know that as the cost of a product is reduced its distribution widens, more persons benefit thereby; the producer finds it possible to step up his production and consequently can employ more labor. It is a cycle that exists in an economy of plenty.

Among the considerations that have not been sufficiently stressed in public discussions of mechanization we might

point first to the fact that cost-reducing equipment is responsible for higher wages—without it we should be reduced to the level of hand labor which existed before the evolution of industry. Cost-reducing equipment makes shorter hours of labor possible because with the aid of the machine a vastly greater volume of production can be turned out in a much shorter space of time.

Better wages—shorter hours of labor—wider distribution of the things upon which modern society thrives, make for

a higher standard of living. And the American standard of living is higher than any other on the globe.

We may note another basic benefit of mechanization. It is exemplified in the equipment programs under way in certain parts of the automotive industry at this moment. The Buick foundry project may serve as an object lesson. Foundry work has been a back-breaking process from time immemorial, involving probably more hard manual labor than any other activity in modern industry. The tendency in mechanization of the foundry has been in the direction of taking the burden off man and transferring it to the machine. Buick has made further progress along this road. The new equipment now installed removes practically all of the manual burden enabling the men to serve as operators very much as the metal cutting workers are operators of machines. This in our judgment is one of the most progressive moves of its kind that has been made in recent years.

The change in the time for making new car announcements this year has started the most spirited activity in new machinery installation among automotive manufacturers since the days of plenty in 1929. Management everywhere is keenly awake to the necessity for modernization. The problem is many sided. Where the present facilities are ample to take care of the market, as in the case of some parts producers, there still remain the questions of better quality and lower costs which cannot be met with existing equipment. If the parts makers are to continue to get their share of the automobile dollar in a highly competitive field, they must take advantage of mod-

The Automobile As A Wage Payer



ONE-TENTH of all wages paid to industrial workers in the United States, one dollar of every ten in the nation's pay envelope, is for labor created as a result of the development and use of the automo-

bile—a mechanical aid to man made possible, in the extent of its present usefulness only through the simultaneous and unprecedented development of mechanized high production manufacturing

the Economy of Plenty

ern manufacturing machinery. From the sociological point of view it must be obvious that the introduction of such equipment is not motivated by a desire to eliminate workers nor does it have that effect. The point is that modern quality and cost standards demand new production means.

Where the market demands an expansion of manufacturing facilities and in any case where reduction in cost is

an essential, the manufacturer must install modern machinery if he is to remain in business. Again we encounter those economic essentials—better product, lower price, wider distribution—failing to meet these requirements the producer is forced out of business and his workers are thrown out of jobs.

If the depression has taught us anything at all, it certainly has impressed upon us the fact that no group can con-

sider itself exempt from the operation of economic law. Automotive manufacturers do not buy production equipment simply to enable the durable goods industries to use black ink. But by modernizing, the automotive industry has stimulated the activity of machinery producers. It is taking a major part in bringing about the general recovery of business and is speeding the return of prosperity.

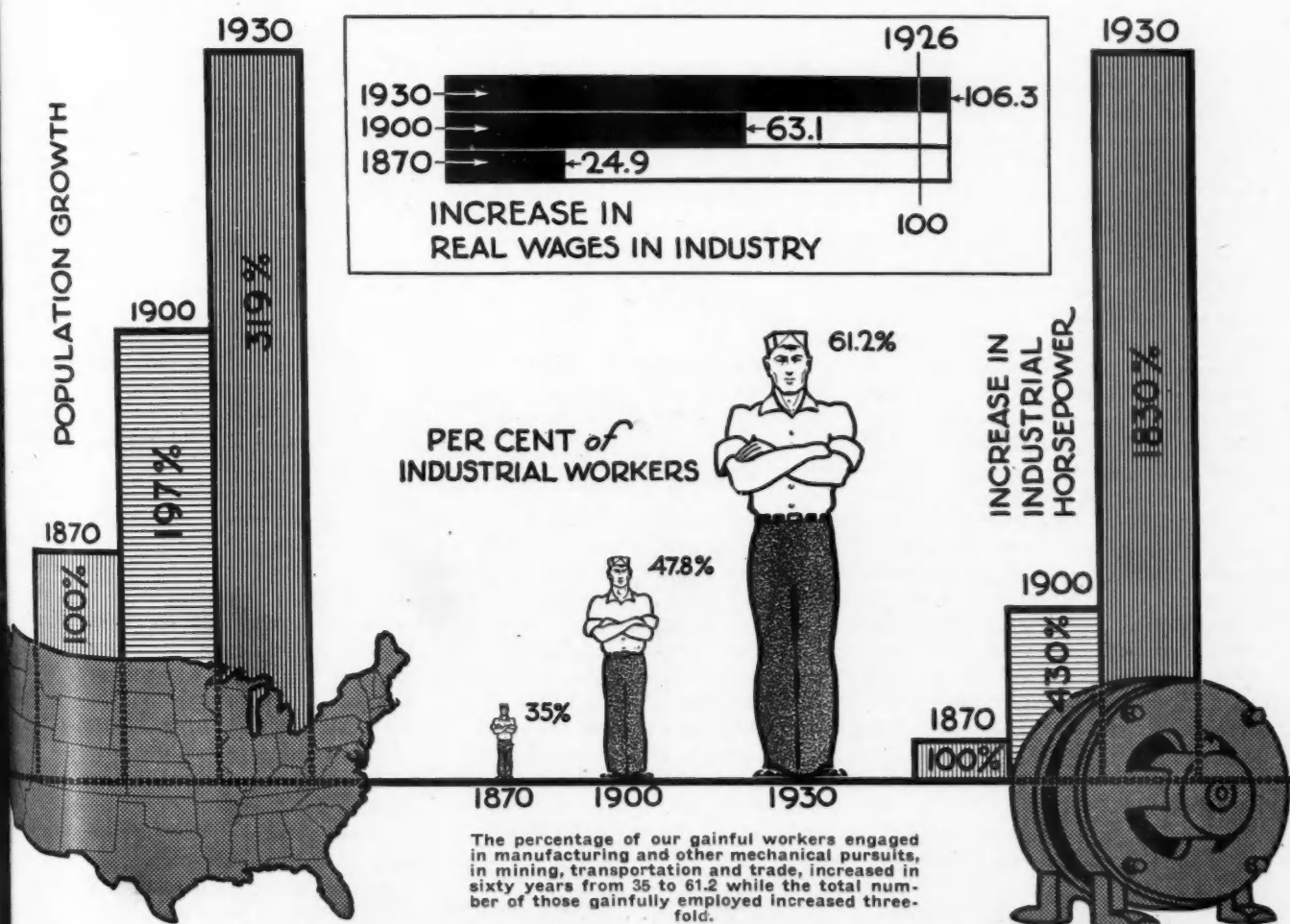
Men AND Machinery

THE extent to which mechanization has contributed in the raising of living standards is evident in almost every contact and activity of our daily life. We buy more things for less money; we travel farther and more often, at higher speeds and less expense; we have more leisure and more comfort because machinery is our tireless and prolific slave.

During the sixty years from 1870 to 1930, with a population growth of 319 per cent, industry, which

is our economic use of the machine, has given employment to an almost constantly increasing proportion of our people. Machinery has made jobs in plenty over a long range of time.

Horsepower in factories, during the sixty years, has increased 1730 per cent. Industrial wages, measured either in current dollars or in purchasing power, have more than quadrupled. The machine is an outstanding benefactor of all mankind. It is the workingman's best friend.



Energy Input Held Constant in New Friction Material Testing Machine

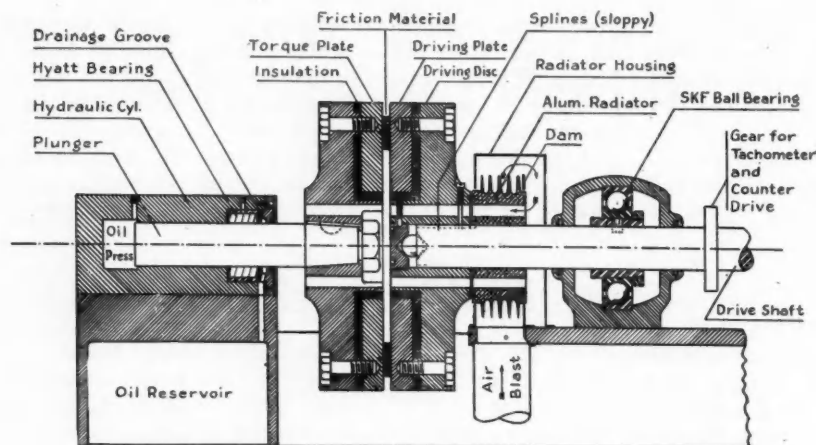


Fig. 1—Longitudinal section through Princeton friction testing machine

A NEW machine for testing friction materials has been developed by the Departments of Mechanical and Chemical Engineering of Princeton University and utilized in a fundamental research project on friction materials initiated and financially supported in the Department of Chemical Engineering by the Thermoid Rubber Co. of Trenton, N. J.

The machine was designed to evaluate the variables affecting such properties as the coefficient of friction, wear-resistance, etc.; to evaluate the effects of operating conditions on performance, and to correlate the performances of various compositions with their physical and chemical properties.

With fixed applied pressures and rotational speed, the energy input in a friction-testing machine is determined by the coefficient of friction, a variable beyond the operator's control. In the machine developed at Princeton the energy input can be kept constant at any desired value by allowing the applied pressure to vary simultaneously with the coefficient of friction, this being accomplished by means of a balancing device which keeps the frictional torque constant. Following are some of the characteristics of the machine:

1. A preselected temperature may be attained at any desired rate.
2. Materials having widely dif-

ferent friction coefficients can be tested under identical temperature conditions.

3. Test temperatures are automatically kept constant regardless of changes in the coefficient of friction.
4. Different materials can be subjected to tests under identical temperature-time conditions.

by Edward P. Culver¹
and Joseph C. Elgin²

The machine, as illustrated by Figs. 1 and 2, comprises two concentric cast iron disks—a driving disk and a torque disk, which latter can oscillate through a small angle only. The test ring is secured to the torque disk and the thrust-producing pressure is exerted in such a manner that it automatically varies inversely as the coefficient of friction of the test material, thereby keeping the frictional torque constant.

The disks are pressed together by means of an hydraulic cylinder with

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plunger, shown at the left in Fig. 1. A light lubricating oil is used as the fluid. Oil pressure is developed in the cylinder by a motorized pump-blower unit consisting of an electric motor driving a small internal-gear pump at one end and a small centrifugal blower for an air-cooling system at the other. The pump draws oil from a supply reservoir in the base and discharges through a hand-regulated relief valve directly back into the reservoir. A line leading from the body of this valve through a needle valve supplies oil to the cylinder. The relief valve maintains the supply pressure at a fixed value.

Three take-off lines are connected to the cylinder. One of these leads to a pressure gage, another bleeds oil from the cylinder back to the reservoir through a needle valve, permitting release of oil from the cylinder, and the third leads to an automatic balancing valve operated directly from the torque arm of the machine in such a manner that the exact cylinder pressure required to balance the torque disk against the applied torque is maintained. The automatic balancing valve is a small piston valve, with metering characteristics, screwed into the top of the reservoir and discharging directly into it.

Other details of the machine can be seen from the drawings.

In operation, temperatures developed
(Turn to page 808, please)

The Bendix Twinplex Brake

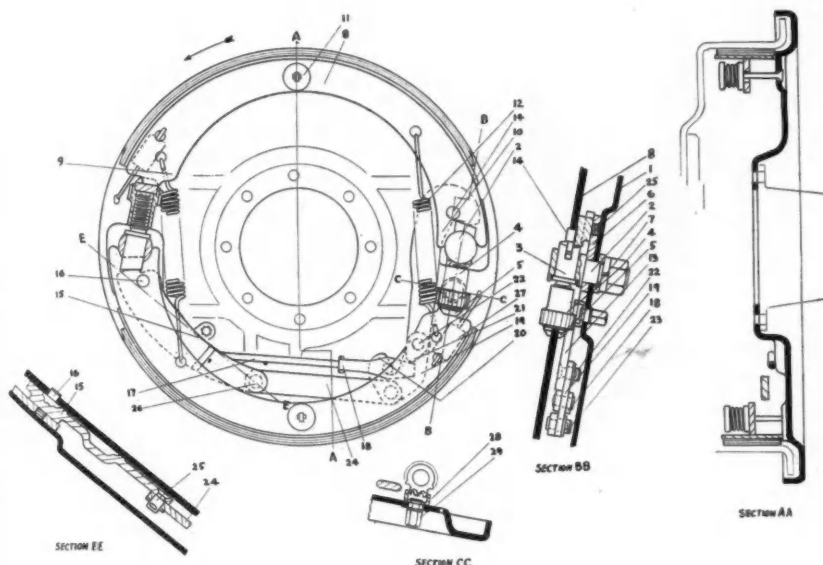


Fig. 1—Bendix mechanically-actuated Twinplex brake. 1, backing plate; 2, anchor pin; 3, plunger passing through anchor pin; 4, adjusting nut on plunger; 5, socket in plunger; 6, reinforcement plate; 7, washer; 8, brake shoe; 9, heel end of brake shoe; 10, toe end of brake shoe; 11, hold-down spring assembly; 12, return springs; 13, 15, cams; 14, 16, pivot points of cams on shoes; 17, brake cable; 18, cable fitting; 19, equalizer; 20, hook on equalizer; 24, strut; 25, anti-rattling springs

BENDIX BRAKE COMPANY has recently announced a new type of brake, known as the Twinplex, which is made in mechanically-actuated, twin-cylinder hydraulically-actuated, and single-cylinder hydraulically-actuated forms. In the Twinplex brake there are two shoes in each drum, each shoe having its own anchor and its own applying mechanism. The principal advantage of this type of brake is that both shoes are self-energizing for both forward and reverse braking, hence each shoe produces substantially one-half of the total braking torque under all conditions, and wear on the linings of both shoes is practically equal.

Referring to Fig. 1, which shows the mechanically-actuated Twinplex brake, operation of the brake in stopping forward motion is as follows: A pull on cable 17 causes equalizer 19 to move to the left, producing an inward movement of pivot 22 of cam 13, and an outward movement of pivot 26 of cam 15, through the medium of strut 24. The unbalancing springs 27 normally urge the heel ends 9 of the shoes and the shoulders of the plunger assemblies against the counterbore in anchor pins

2. The reaction of cams 13 and 15 against plungers 3 causes pivots 14 and 16 of the cams to move the toe ends 10 of the shoes against the drum, the heel ends of shoes 9 pivoting against sockets 5. Rotation of the drum being counterclockwise, a further pull on the brake cable 17 will cause the toe end of the shoes to be applied with added pressure against the drum, and the friction thus produced will cause heel ends 9 of the shoes to shift slightly against sockets 5 until the clearance between the heel ends and the drum is taken up, this being accompanied by further outward movement of the toe ends of the shoes until the shoes make full contact with the drum. Further pull on cable 17 will produce a braking torque proportional to the force on the cable.

Equalizer 19 is made with unequal arms and distributes the cable pull in such a way that the thrusts at cam pivots 14 and 16 are approximately the same.

Operation of the brake in reverse braking is as follows: A pull on cable 17 causes toe ends 10 of the shoes to

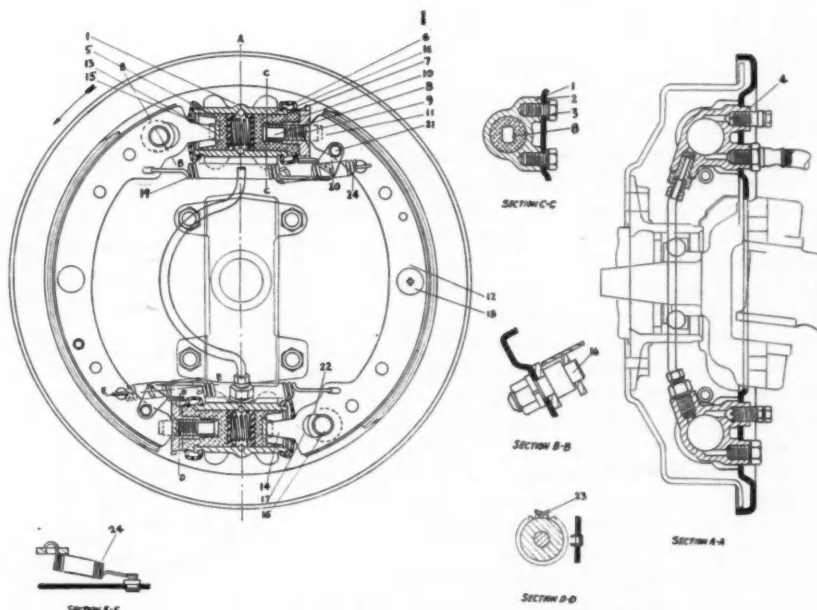


Fig. 2—Bendix hydraulically-operated twin-cylinder Twinplex brake. 1, hydraulic cylinder; 2, backing plate; 3, cap screws securing cylinder to backing plate; 5, toe piston; 6, heel piston; 7, flange on heel piston bearing against end of cylinder; 8, depression in piston 6 and flattened end of adjusting screw 9; 10, adjusting nut; 11, heel end of shoe 12; 13, bearing plate of toe piston; 14, toe end of shoe 12; 15 and 16, boots sealing ends of cylinders; 19, shoe-retracting springs; 20, locking clip for locking adjusting nut; 23, V-shaped end of lock clip

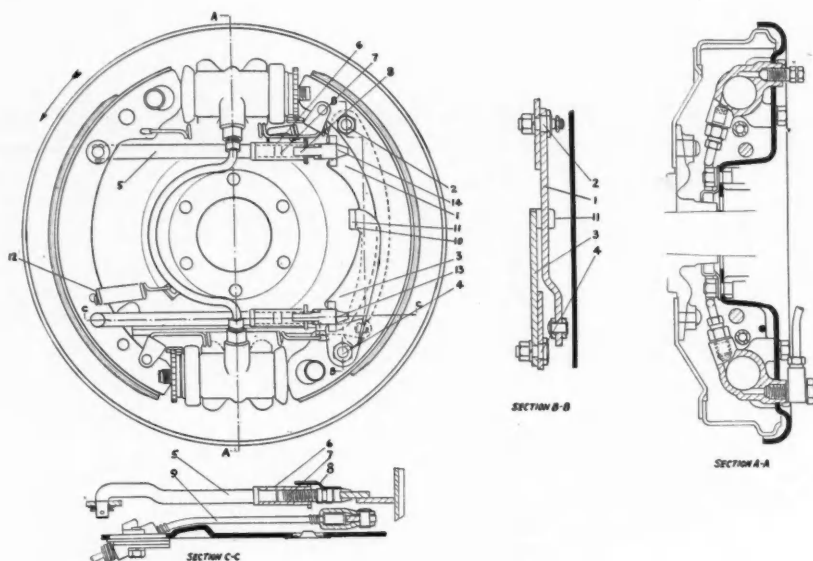


Fig. 3—Mechanism for hand-actuation of rear brakes. 1, lever pivoted at 2; 3, lever pivoted at 4; 5, strut; 6, adjusting nut; 7, adjusting screw; 9, brake cable; 10, cam surface; 11, lug; 12, unbalancing spring; 13, fulcrum point of lever 3

move out against the drum in the same way as described for forward braking. However, the drum is now rotating in a clockwise direction, and a further pull on the cable will produce added friction between shoes and drum, causing the shoes, cams and plunger assemblies to shift slightly in a clockwise direction until the clearance between the notch of toe ends 10 of the shoes and anchor pins 2 has been taken up. Further pull on the cable will cause plungers 3 to move out farther in a clockwise direction and apply the heel ends 9 (which now become the toe ends) further against the drum, the braking torque produced being proportional to the cable pull.

Anchor pins 2 are radially adjustable in elongated holes in the backing plate. When the brakes are first assembled, the shoes are set to the proper clearance by means of a dummy drum. The clearance between shoes and drum is determined by the position of anchor pins 2 and by the adjusting nuts 4, which latter are rotated by a wrench on shank 29 of adjusting gear 28. One end of the return springs 12 is hooked on the shoe in such a way that the first two coils press against the teeth of adjusting nuts 4. This serves as a lock and also produces an audible click which facilitates adjustment.

All adjustments for wear are made by means of adjusting gears 28, which are accessible on the outside of the backing plate.

Advantages claimed for the mechanically-actuated Twinplex brake are relatively light pedal pressure combined with a high degree of controllability, availability of a wider range of brake linings, equal distribution of pressure

on linings, balanced drum distortions, simplified adjustment, and constancy of performance.

The hydraulically-actuated Twinplex brake is similar in principle to the mechanically-actuated type. In the case of the brake with twin cylinders, illustrated in Fig. 2, two hydraulic cylinders actuate the shoes, instead of cams. For parking, the hand lever is connected to the rear brakes by means of the usual cable-and-conduit hook-up. A mechanical actuating mechanism is provided in the rear brakes giving

"Twinplex" actuation of the shoe for forward and reverse braking.

Referring to Fig. 3, in forward braking, a pull on the hand lever will move cable 9 to the left, causing lever 1 to pivot about pin 2 and move the toe of the front shoe out against the drum. At the same time the cam surface 10 of lever 1 drives the lever 3 through the lug 11. Owing to the reaction of the unbalancing spring 12, lever 3 will fulcrum about adjusting screw 7 at 13, and move the toe of the rear shoe out against the drum. Further pull on the hand lever will cause the shoes to be seated firmly against the drum and produce braking torque.

The single-cylinder type of Bendix hydraulically-operated Twinplex brake is similar in design to the mechanically-operated type described in the foregoing and is illustrated in Fig. 4. The main difference is that a single, closed-end hydraulic cylinder actuates the cams through the medium of a lever pivoted on the backing plate. In order to provide mechanical operation of the rear brakes for parking, the hand lever is connected to the rear brakes by means of the usual cable-and-conduit hook-up. Cable 9 is provided with a fitting 10 connected to pin 6 of operating lever 1. When the pedal is depressed for service operation of the brakes, the cable fitting 11 overruns into fitting 10.

One point in favor of single-cylinder hydraulic actuation as compared with the twin-cylinder type, is the reduction in the number of sealing cups and piping joints.

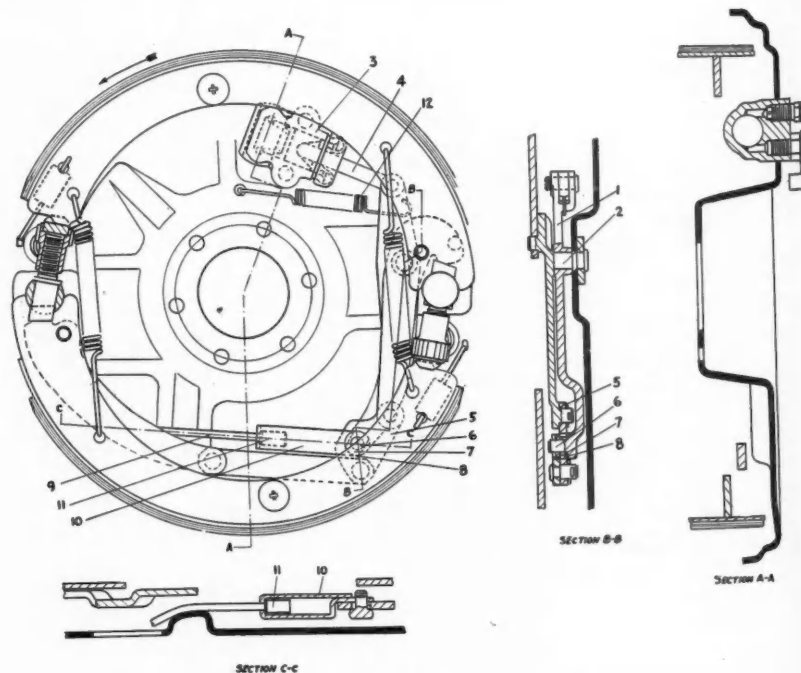
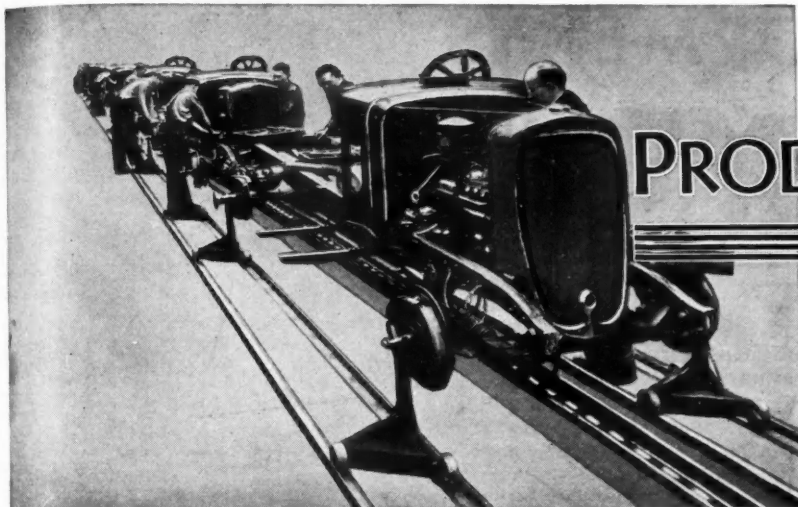


Fig. 4—Bendix hydraulically-operated single-cylinder Twinplex brake. 1, operating lever pivoted at 2; 3, hydraulic cylinder; 4, strut; 5, equalizer; 6, pin; 7, bushing; 8, slot in equalizer; 9, brake cable; 10, cable fitting; 11, cable terminal; 12, piston retracting spring



PRODUCTION LINES

cover the same territory as the newspapers over here. Advertising to the car user will get the best attention through papers like *The Motor* and *The Autocar*, as we understand the situation.

Improved Method

A new manual on electroplating has been issued by the R & H technical bureau. It summarizes the industrial applications of the process and gives detail information concerning the control and operation of the bath. Metallurgists and factory executives take note.

More Welding

Some tricky things being done with welding today. One job recently put in production welds steel strip to a steel casting. Another is on the way to weld a stainless steel strip to cast iron.

Radio-wise

From what we hear, one of the specialty parts makers has taken a license to build radio for car factory installation. This will create some competition for the radio fellows who have had a clear field up to now.

Second Edition

"The Book of Stainless Steels—Second Edition" edited by Ernest E. Thum, just off the press brings up to date in enlarged scope the valuable reference work that was published in 1933. It is presented in six sections covering every aspect of fabrication and application data as will be evident from the main section's headings—General, Production and Fabrication, Properties of Typical Alloys, Specialized Tests, Requirements of Consuming Industries, Indexes. In its present form, representing the sum of our present knowledge of this important family of engineering materials, this book should be of great value to engineers, metallurgists, and factory

executives. It is generously illustrated and runs 787 pages including the index. Published by The American Society for Metals.

June Flashes

According to advance proofs of "Flashes" for June, we learn that Thompson-Gibb has a welder designed specifically for aluminum and other non-ferrous materials. The same machine may be used as a standard welder for a variety of other kinds of work. There's the job for those who have a lot of non-ferrous welding to do.

Unusual Tubing

Summerill Tubing has issued a splendid handbook showing not only its line of tubing for every need but filling a need for a source of information on unusual tube forms. Summerill makes tubing in amazing variety, out of every kind of modern engineering material. Streamline, composite, instrument, pressure, and diesel fuel injector tubing, are among the varieties listed. Engineering data includes tolerances, physical specifications, weights, and general tables. We recommend it highly.

British Press

We have a letter from the editor of *The Motor* (England) which should be of interest to those who have a message for the British motoring public. The gist of it is that the group of well-known motor publications in England operate quite differently from our own technical journals. They circulate widely not only in the trade but also to the great motoring group of car owners. In effect these journals

Alky Drive

The drive for alcohol-from-corn blends in gasoline is spreading subtly on many fronts. Like certain other ill-conceived legislation, it has a laudable objective—farm relief—but its backers seem to know nothing at all concerning its practical limitations. Even if the blended fuel were eminently suitable, despite the U. S. Bureau of Standards report to the contrary, there still remain the economic implications chief of which is the fact that an essential fuel may become subject to the fluctuations of a grain market. Quite aside from this—does anyone want another law that seeks to make a criminal out of any person who might choose to produce or market a fuel that does not contain alky in specified proportions.

Wagner Bill

Col. Knox made a point concerning the pending Wagner Bill that should be of significance to labor leaders. He showed historically that both Germany and Italy had strong labor union organizations—and when labor became a State matter, by law or decree, it lost all its privileges and today strikes are outlawed and wages and working conditions rigidly controlled. In this country labor is relatively free of restrictions. What will happen if it becomes herded under a central authority whether it be a labor union or government agency?

J. G.



NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Direct Reading Air Velocity Meter

The Boyle Velometer, offered by the Illinois Testing Laboratories, Incorporated, Chicago, Ill., is a direct reading air velocity meter which gives accurate and instantaneous readings of the speed and direction of air motion measured in feet per minute. It is housed in an attractive black bakelite case and weighs approximately two pounds.

Air enters through a port or a jet and tube (depending on the style used) and leaves through a port on the right side of the meter. This air passing through the meter actuates a movement comprising a vane, control springs, pointer, and magnetic damping system.

No mathematical calculations or stop watches are necessary to determine the velocity readings. A pointer locking button is provided to lock the pointer to retain the reading or when the instrument is not in use. The Velometer is furnished in two types each with a double range scale.

The Shutter type, as the name implies, is furnished with a shutter for opening or closing the port for changing the range and is not provided for tube attachment. This type is ideal for taking quick commercially accurate readings such as in heating and ventilating and air conditioning work.

The Tube type Velometer illustrated is similar in size and appearance to the Shutter type. When used for the low range readings, the tube attachment is removed and the air enters directly through the port. For high range readings, tube attachment with

a suitable jet is used. The Tube type Velometer, in addition to being useful for heating and air conditioning service, fills a need in industrial plants for determining air movements in dryers, kilns, or other like equipment.

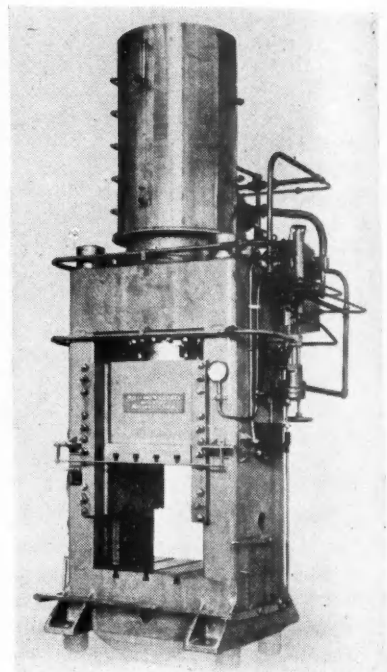
The standard scale range is 0-300 and 0-3000 feet per minute, although other ranges are also offered. The low scale on either type provides accurate readings as low as 20 feet per minute. The high scale provides accurate readings up to the maximum limit of the scale.

750-Ton Straightening Press for Castings

The latest development in the line of heavy machinery built by Williams, White & Company, Moline, Ill., is a 750-ton straightening press for large malleable castings. It is a completely self-contained hydraulic press of the rigid frame type, with tie rods shrunk in place and the ram guided on the cast housings with adjustable gibs.

The control of the ram is through foot treadle and hand lever operation designed so that the press will make one complete cycle with the depression of the treadle, stopping in the up position. The stop position at the top of stroke is adjustable to set for short strokes. An adjustable time delay is furnished to change the length of dwell under high pressure before the automatic reversal of the ram.

The rapid traverse of the slide to and from the work is accomplished by kicker cylinders, and an automatic surge valve fills the cylinder during the

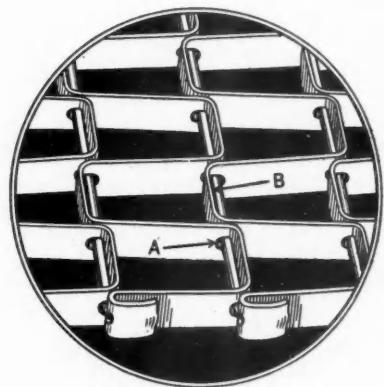


traverse stroke. A press of the capacity shown (750 tons) is capable of 12 strokes per minute. Hydraulic pressure is furnished by the latest type Oilgear rotary pump, with unloading control which permits it to hold full volume until full predetermined and pre-set pressure is reached.

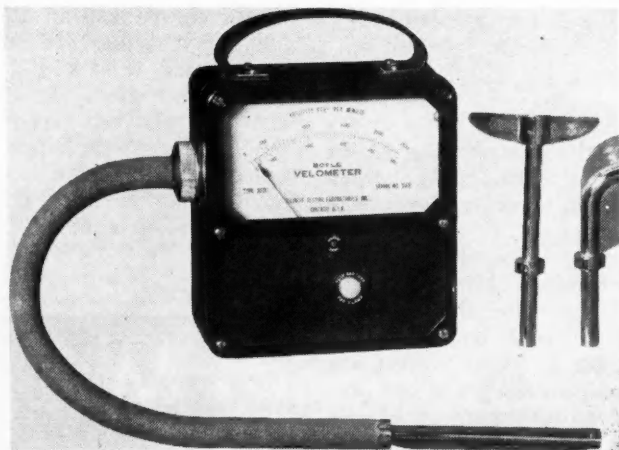
These presses can be furnished in capacities of 200, 300, 450, 600, 750, and 1000 tons.

New Design of Steel- Mesh Conveyor Belts

Acme Steel Company, Chicago, Ill., manufacturers of open mesh, steel conveyor belts for many years, has recently



announced an improvement in construction of these belts. Belts are especially adapted for conveying products through drying ovens, for sorting and assembling departments, etc. The open mesh allows free circulation of air, heat, water, steam, making it the ideal conveyor for products that must be washed, cooled, or dried. Manufactured of cold rolled strip steel, electro-



galvanized to resist rust, or of Acme stainless steel.

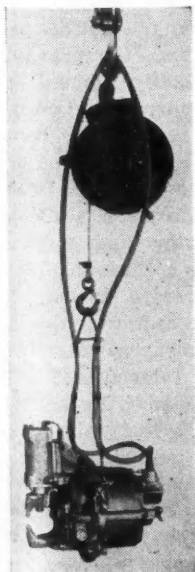
Acme belts are composed of formed spindles of flat steel connected by pivot rods. Formerly, these rods were strung through round holes, and the edge of the hole was the only bearing for the rod. To reduce wear on these rods, the holes are now elongated to a point where the entire flat surface of the U shaped section is utilized as a bearing. This change has materially increased the serviceable life of the belts, and has also increased the flexibility and smoothness of operation.

Low Weight Spot Welder

Total weight of only 80 lb. which strikes a new low and power factor of 76 per cent are the arresting features of a new portable spot welder just announced by the Fassler Welding Machine Co., Detroit, Mich. The machine was developed by P. W. Fassler as an outgrowth of an early design which he installed in a large body manufacturing plant over ten years ago.

It is rated at 7 kva and with a power factor of 76 per cent, it is capable of welding 2 x 1/4 in. stock intermittently with an approximate time cycle of 50 cycles. The machine is mounted in a firmly anchored ring which permits the operator to swivel the welder without effort to any desired angle. The cylinder of machine is strongly set on trunnions and can be adjusted to any throat length within reasonable limits. This provides the flexibility needed to adapt the machine to any job with comparatively little expense, simply by providing separate attachments.

The welder can be suspended from a balancer to permit a revolving motion when necessary. It is water cooled and dust proof throughout, also air operated and provided with the patented



NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Fassler two-turn secondary transformer which considerably lessens the weight of the machine and increases its kw capacity. The electrode arms and electrode points are made of special material, having 120 Brinell and over 90 per cent conductivity.

Simplex Grinding and Lapping Machine

The Simplex carbide grinding and lapping machine offered by the Stoker-



unit Corp., Milwaukee, Wis., is said to be a simple, rigid and accurate equip-

ment for grinding and lapping all sorts of carbide tools. Two well supported tables are provided for the tools, each with means for shifting the table in relation to the face of the wheel and for accurate angular settings. A protractor which is interchangeable between the two tables is also furnished, making it possible to grind and lap tools with the same setting. The lapping disk is of high grade cast iron, charged with diamond dust and oil.

This machine can also be provided with pump, oil pan and supply tank having the wheels hooded to prevent splash from being thrown around the machine.

The Option Problem Gets Steadily More Difficult

(Continued from page 799)

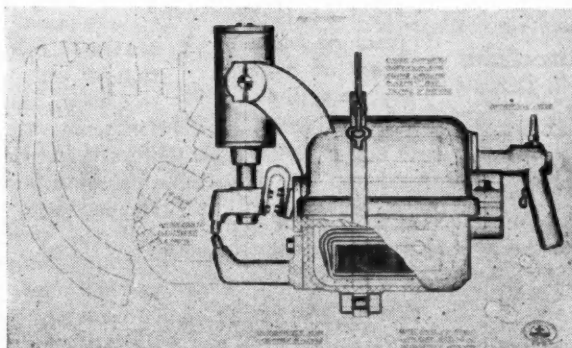
sometimes impossible to find enough cars about to fill the special requirements for a day's shipment.

The trouble is that in the mind of the individual dealer the problem is non-existent. He is an individual and can't understand why it should be difficult to get two or three cars with added trifles like a radio and a cigar lighter. He doesn't see that hundreds and thousands of dealers may be demanding other specials whose accumulated total bottle-necks the production line.

Perhaps a part of the answer lies in so arranging the attachment of special fittings and accessories that they may be installed by the dealer. Even if this costs more money it may prove to be the most economical procedure all along the line.

Color, upholstery, wheels, etc., can be scheduled at the factory provided the options are within reason, although there still will be the complications due to options on mechanical attachments such as a special clutch or an over-drive, or special starting device, or something else. Nevertheless, the more that can be shifted to the dealer's shop the less the complication at the factory and the better the chances of getting good deliveries.

Here is something that deserves intelligent treatment on the part of dealers and the factory organization.



Energy Input Held Constant in New Friction Material Testing Machine

(Continued from page 802)

in the friction material are measured by a multiple-junction thermo-couple and a Hoskins pyrometer, the junctions being distributed around the circumference of the rings.

It has been found that the equilibrium operating temperatures with this machine, as well as the temperature-time curves obtained, are dependent only (within the range of experimental errors) on the applied torque and independent of the nature of the friction material and its coefficient of friction. For various fixed values of the torque exerted, corresponding to various weights on the torque arm, practically identical, reproducible temperature levels and time-temperature curves result. By way of illustration, results from two different materials subjected to the same temperature-time conditions, are reproduced in Fig. 3. It will be seen that although the friction coefficients for the two materials differ widely, the temperature-time curves are identical for both.

Two possible objections to the machine were anticipated. One is that the hydraulic method of obtaining the pressure between friction surfaces does not give the true value, as it leaves out of account the friction of the plunger in the cylinder. It has been found as the result of extensive tests that, owing to the easy fit of the plun-

ger, the forced lubrication, the balanced construction, and the slight oscillation of the plunger in use, its friction in the cylinder is negligible. A second possible criticism is that the applied pressure is permitted to vary during tests, and the effect of pressure variations on the coefficient of friction is uncertain and unmeasurable. This

objection is met by the statement that any effect of pressure on the coefficient of friction is relatively small, compared with variations of temperature, except perhaps for very high pressures, wide pressure ranges, and temperatures producing softening of the test material. Besides, the coefficient of friction is a physical quantity which by definition is independent of the pressure. It is therefore evident that any observed effect of pressure on its value must be due to alteration in the chemical or physical nature of the material, most probably produced by heat.

Although the machine is not designed for commercial testing, the principles embodied may be readily adapted to a machine for that purpose. Continuous records of test results may be obtained in a simple manner by the provision of a pressure recorder (which might take the form of a simplified steam-engine indicator and be calibrated to record the coefficient of friction directly), to record thrust continuously, and a recording pyrometer for temperature measurements. If it were desired to run intermittent tests, this could be accomplished by using a stepped piston in the hydraulic cylinder and providing an automatically operated four-way cock to reverse the piston thrust. Tests at constant pressure may be run simply by shutting off the automatic balancing valve.

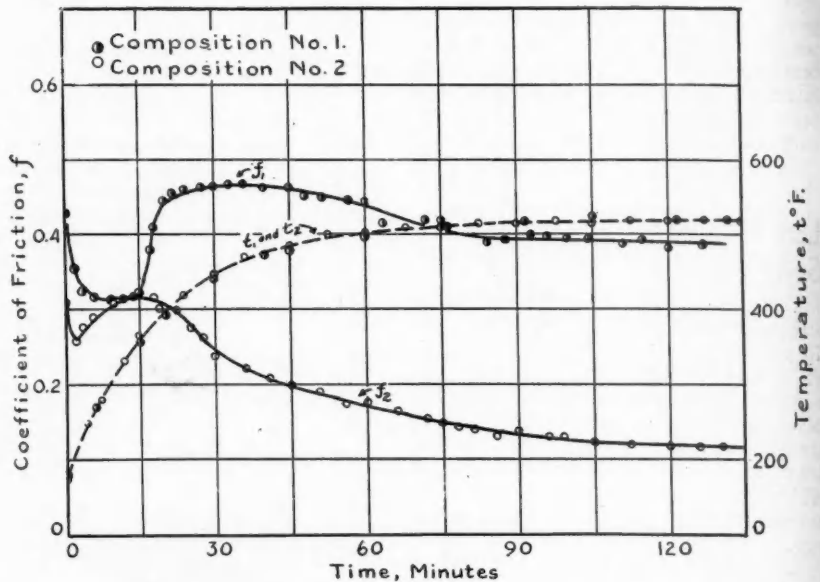


Fig. 3—Plot of friction-test results on two different compositions

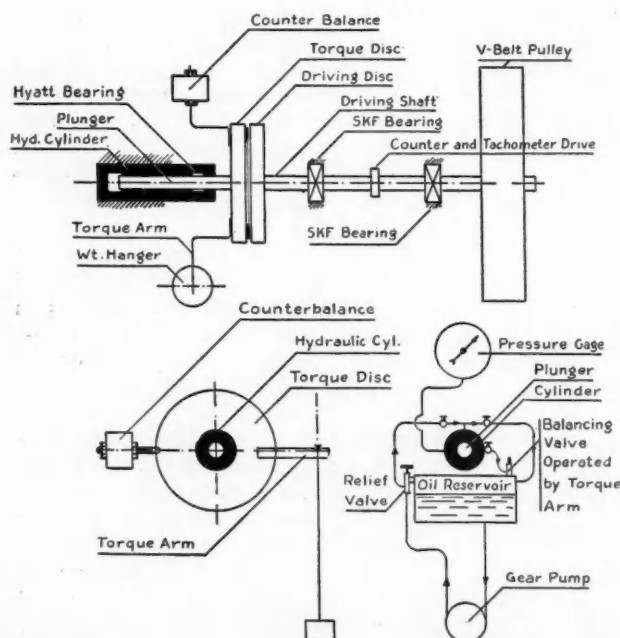
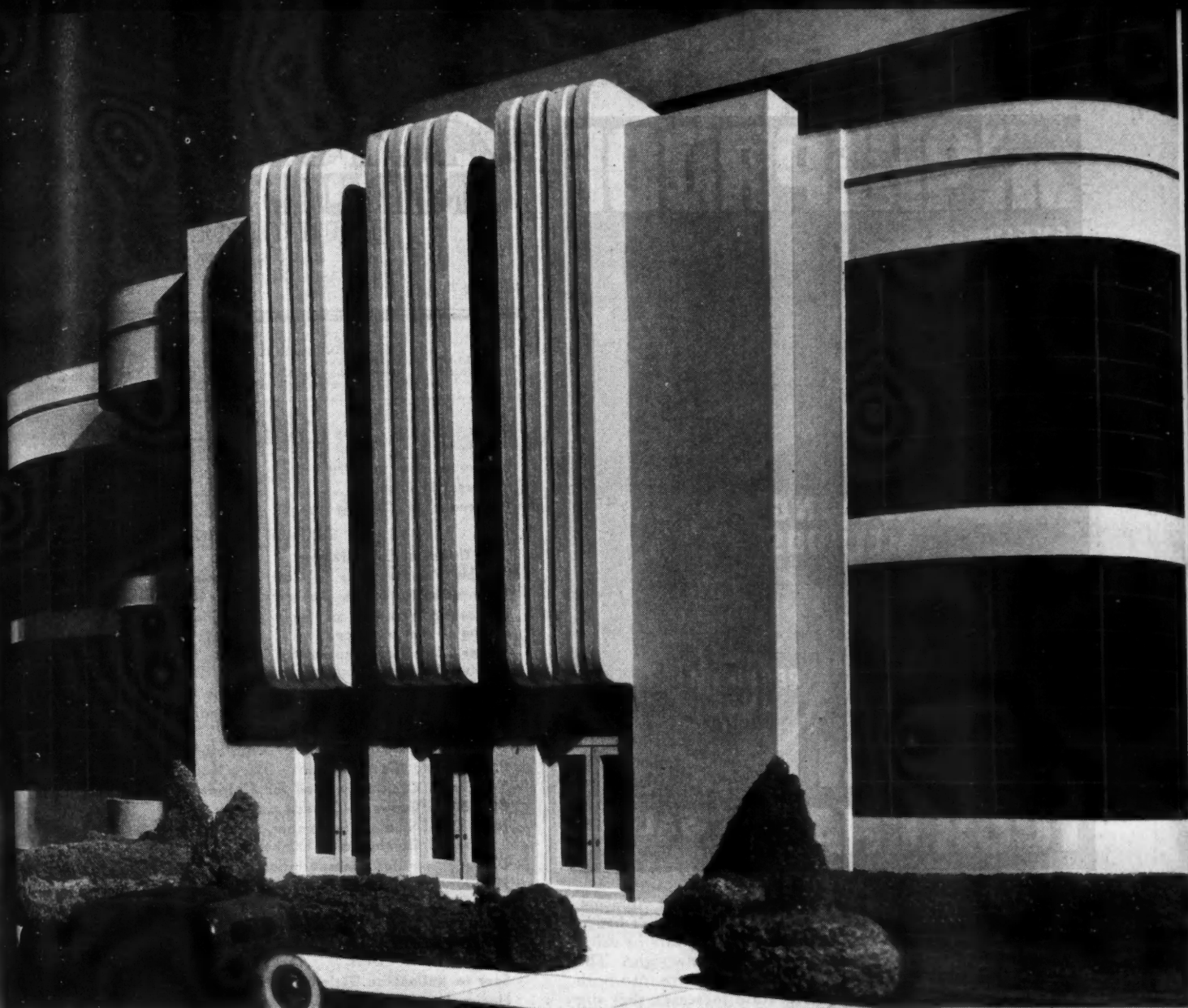
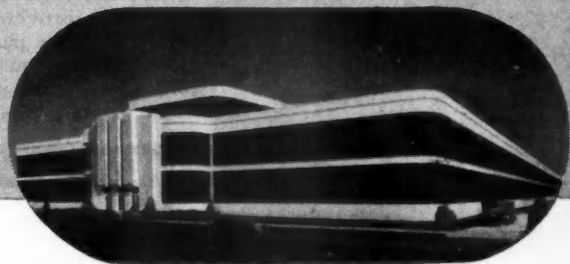


Fig. 2 — Transverse section of friction-testing machine and diagram of hydraulic system



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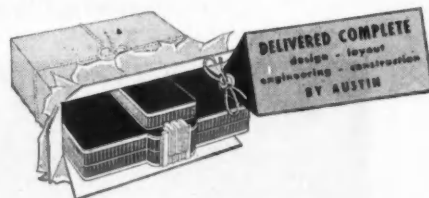
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